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“YOUR BODY IS A TEMPLE”: TYPE-2 DIABETES IN MISSISSIPPI AND THE POTENTIAL ROLE OF THE BLACK CHURCH IN DIABETES EDUCATION AND INTERVENTION

by
Jonathon Troy Jackson

A thesis submitted to the faculty of the University of Mississippi in partial fulfillment of the requirements of the Sally McDonnell Barksdale Honors College

Oxford
May 2012

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ABSTRACT

JONATHON TROY JACKSON: "Your Body is a Temple": Type-2 diabetes in Mississippi and the potential role of the Black church in diabetes education and intervention
(Under the direction of Susan Pedigo)

Type-2 diabetes and obesity are two major health complications that are affecting many Mississippians, namely the African American population. A substantial amount of research has been conducted that explains the high prevalence rate of type-2 diabetes and obesity in the African American community as partially due to many secondary factors, including the Southern cuisine, food scarcity, physical inactivity, and poverty. Recently, efforts to reach the African American population about diabetes education and prevention in other Southern states have been directed to faith-based organizations. Researchers have hoped that faith-based intervention might be better suited at helping a wider audience in a more sustainable and long-term manner.

Such studies of faith-based intervention, however, have been rare in Mississippi. This study aims to qualitatively assess the current landscape of health ministry and nutritional awareness in the African American churches of Mississippi. Pastors from eight churches were interviewed about their church's food service, their experience with health, their opinions on health and the Bible, and their willingness to incorporate change. These interviews were then used to pinpoint potential obstacles, novel ideas, and predictors of success in future studies using faith-based intervention in Mississippi churches.

Through this research, I hope to generate much needed dialogue and scientific analysis of nutritional health and reveal the potential impact that the African American church can play in preventative health initiatives. By using non-traditional, culturally competent methods, preventative health programs may be able to produce more effective and longer lasting results by utilizing the power of culture and community to instigate change in the incidence and prevalence rates of type-2 diabetes in Mississippi's African American population.

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LIST OF ABBREVIATIONS

AME	African Methodist Episcopal
ATP	Adenosine Triphosphate
BMI	Body Mass Index
CBPR	Community Based Participatory Research
CDC	Centers for Disease Control and Prevention
DPP	Diabetes Prevention Program
FFA	Free Fatty Acid
GI	Glycemic Index
HDL	High Density Lipoprotein
KANWU	Kuopio, Aarhus, Naples, Wollongong, and Uppsala centers
LDL	Low Density Lipoprotein
LMD	Lower Mississippi Delta
LMDNIRC	Lower Mississippi Delta Nutrition Intervention Research Consortium
MB	Missionary Baptist
NIH	National Institutes of Health
PA	Physical Activity
RCT	Randomized Controlled*l* Trial
TAG	Triacylglycerol
USDA	United States Department of Agriculture
USDHHS	United States Department of Health and Human Services
VLDL	Very Low Density Lipoprotein

1. INTRODUCTION

Type-2 diabetes is a metabolic disorder, characterized by the body's ineffectual response to insulin, often referred to as "insulin resistance," and a sustained inability to return to normal insulin levels (Lazar, 2005). As opposed to type-1 diabetes, type-2 diabetes is characterized by a combination of reduced production of insulin as well as a resistance to regulatory effects of this pancreatic enzyme (Polikandrioti, 2009). Type-2 diabetes is often discussed in tandem with obesity, and past research has revealed a substantial connection between weight gain and an increased incidence of diabetes (Ford, 1997). It has also been shown that physical activity aids in the management of blood glucose levels, allowing for more than a 30% reduction in the incidence of type-2 diabetes (LaMonte, 2005).

In 2010, 34% of Mississippians were considered obese, making it the fattest state in the United States. In addition, Mississippi was ranked as having the highest percentage of leisure time physical *inactivity* of 31.7% in 2007 (CDC). Similarly, the Mississippi Department of Health and the CDC rank the state as second in the nation in diabetes prevalence in 2010, with 12% of the adult population having type-2 diabetes. Much of this health epidemic can be attributed to a few factors, namely high consumption of popular Southern foods, food scarcity in many Mississippi counties, physical inactivity, and poverty within Mississippi (McGee, 2007; Stuff 2004, Weinrich, 2007). Only addressing these problems, however, will not lead Mississippi in the right direction

when it comes to diabetes prevention. It takes cultural competence and a willingness to utilize culture and social structure to facilitate preventative health. The latter portion of this document focuses not only on the importance of the African American church for African Americans in Mississippi but discusses the extent to which these churches could be used as a more effective means for health education and diabetes prevention.

2. STATISTICS

2.1 UNITED STATES DIABETES STATISTIC:

According to 2010 CDC estimates, 18.8 million people aged 20 years and older have been diagnosed with some form of diabetes, with almost two million of these as incident cases (CDC, 2011). The median age for type-2 diabetes is app roximately 50 years of age; however with increasing rates among children and adolescents in recent years, this number might actually drop (CDC, 2011, Fagot-Campagna, 2000). From 1980 to 2010, the prevalence of diabetes cases in the United States has more than tripled (CDC, 2011). It is difficult to differentiate statistics and trends between type-1 and type-2 diabetes, but researchers have concluded that type-2 diabetes accounts for almost 90% of all diabetes cases nationally and is virtually the only form of diabetes present when analyzing statistics from people over the age of 45 (CDC, 2011; Kenny, 1995).

Geographically, type-2 diabetes has a differential regional aspect in the United States. Based on age-adjusted diabetes rates in 2009, 13 of the 16 Southern states had diabetes rates over 9.0%, and only 15 states in the entire United States fell under this statistic; of the remaining Southern states, Florida, Virginia, and Delaware were found to have diabetes prevalence rates between 7.5%-8.9% (CDC, 2011; Census 2012). In 2010, Alabama had the highest prevalence of diabetes, at 13.2%, while only 5.3% of the population in Alaska suffers from type-2 diabetes (County Health Rankings 2010).

When stratified by race, an interesting pattern emerges. Approximately 10.2% of non-Hispanic whites over the age of 20 have diabetes as compared to 18.7% of all non-Hispanic blacks (CDC, 2011). The incidence of diabetes is lowest for non-Hispanic whites, at 7.7 per 1,000 and highest for African Americans, at 13.0 per 1,000. Approximately 0.4% more diagnosed cases of type-2 diabetes appear in the Asian American population than in the non-Hispanic white population (CDC, 2011). In 2009 data for American Indian and Alaskan native populations, 16.1% of people were diagnosed with diabetes, ranging from 5.5% for Alaskan Natives and an upwards of 33.5% for American Indians living in the Midwest. However, the most telling statistic is the risk on developing type-2 diabetes. Compared to non-Hispanic white adults, the risk of developing diabetes is 77% higher among the non-Hispanic black population and 66% among the Hispanic populations. Asian Americans followed with an 18% higher risk.

Type-2 diabetes has become the seventh leading cause of death in the United States and is the major cause of a variety of serious complications such as kidney failure, lower-leg amputations, heart disease, and stroke. In 2007, 231,404 people died from diabetes complications; but this number is probably underreported due to the wide variety of problems that can arise from poor metabolic and insulin control. Because of the complications that can emerge as a result of diabetes, the risk of death of a person with diabetes is twice as likely than a healthy individual of the same age; and this risk only increases with age (CDC, 2011; Deshpande, 2008).

Obesity is also a known risk factor of type-2 diabetes (Ford, 1997). CDC data indicates that two-thirds of the adult population with diagnosed diabetes has a body mass index (BMI) over 27. A BMI over 25 is classified as overweight and generally unhealthy

(2012). According to national maps provided by the CDC, obesity is most heavily found in the Southern region of the United States, with Texas, Oklahoma, Louisiana, Mississippi, Arkansas, Tennessee, Missouri, Alabama, Georgia, South Carolina, Kentucky, and West Virginia all having at least 29.6% of the total population classified as obese (2010). These states correlate perfectly with 2010 data on states in the highest quartile of age-adjusted percent of the population with diagnosed type-2 diabetes (CDC).

2.2 MISSISSIPPI STATISTICS:

Mississippi has the highest percentage of obesity as well as having the highest percentage of leisure time physical inactivity of each of the 50 states in the United States (CDC, 2012). As a result, the age-adjusted population percentage of Mississippians with diagnosed diabetes is one of the highest in the nation at 12.4% second only to Alabama (CDC, 2012). In 2000, Mississippi was the only state to place in the highest quartile of the age-adjusted population diagnosed with diabetes (7.5-8.9%). In 2009, 14 other states joined Mississippi in having age-adjusted prevalence rates around 9%. According to the CDC in 2007, two Mississippi counties, Holmes County and Jefferson County, ranked in the top five in a nationwide county-comparison of high-end diabetes prevalence with 15.0% and 14.9% of the population affected, respectively. These two counties were joined by Humphreys County when analyzing counties with the highest obesity rates. An estimated 42.6% of the population in Holmes County was diagnosed as obese. Approximately 41.% and 44.2% of the population is obese in Humphreys County and Jefferson County, respectively. Of the 82 Mississippi counties in 2008, only four, in fact, had diabetes prevalence rates below 10.2%; and those four counties averaged prevalence rates at 9.8% (CDC, 2012).

A major focus for this thesis and for many of the health problems in Mississippi is the severity of health problems found within the Mississippi Delta, a group of eighteen Mississippi counties located alongside the Mississippi River. Based on 2010 U.S. Census data, 60.3% of Delta citizens are African American, and 31.5% live below the poverty line. Of these African American citizens that live in the Mississippi Delta, over 50% live at or below the poverty line (Dabir, 2000). To put these statistics in perspective of the rest of the state, only 36.3% of Mississippi residents identify as African American and Mississippi's poverty rates hover around 19.9%. The Mississippi Delta harbors a disproportionate number of poor African Americans and its residents suffer from higher rates of illness like type-2 diabetes.

In fact, 13.14% of Delta African American residents have been diagnosed with type-2 diabetes (range of 11.1% to 14.9%), just above the statewide average (US Census, 2010). As for the overall picture of general health factors and health outcomes in Mississippi, the Mississippi Delta counties consistently rank in the lowest quartile as having the worst health outcomes, including mortality and morbidity rates; the worst health factors, including health behaviors, access and quality of clinical care, and social and economic support; and the poorest environment quality. The implications from such results imply that the health of Mississippi Delta counties cannot be expected to improve without a consistent and committed effort to implement health-related programs and policies that impact the wellbeing of its citizens (County Health Rankings, 2011).

3. TYPE-2 DIABETES AND THE DIET

Modern-day cars run on gasoline. Gasoline is the life force that allows the motor to turn, combustion to occur, and the car to move. Once loaded into the fuel tank, gasoline is stored until the driver wants the car to move; and when in motion, it is released only in amounts sufficient to allow the car to move continuously at a specific velocity. As the car slows, less gasoline is used and more is stored. Also, without pure gasoline, cars would not be able to work. Using gasoline that is dirtied with particles would destroy the engine overtime if left untreated, and substituting any other liquid for gasoline would destroy the engine as well as the car. The human body's reliance on food works in a parallel fashion. The body is the car that needs food, its fuel, to operate effectively and efficiently. But it does not need just food. It needs the right balance of food. The body has a specific requirement of carbohydrates, proteins, and fats, and deviating from the needed combination is similar to giving a car dirty gasoline. Though the car continues to work, it will soon become damaged, less responsive, and could even cause serious, irreversible problems like a loss of vision or lower leg amputation.

Metabolism is the necessity of life. The human body uses the intake of food as its only source of energy, and specific mechanisms have been put in place to make sure that this food is utilized to its full capacity. Each nutrient ingested, carbohydrate, protein, or fat, is metabolized in a specific way and transported by specific pathways throughout the

body. For a person eating a normal and balanced diet, these processes work almost flawlessly in giving off energy to areas vital to ensuring proper function and survival. From moving muscles to replacing damaged cells, the body is constantly needing and using energy to keep itself current and strong.

When excess nutrients have been digested, various parts of the body will become similar to a gas tank and will store any extra energy until it is needed again, but it is important to understand that as long as the body is still alive, it is constantly metabolizing and using energy. In the human body, storage of nutrients is regulated by the insulin hormone. Produced by the pancreas, this hormone is secreted after a meal when the body experiences high blood glucose levels. The different ways insulin affects the body's metabolism is listed in Table 3-1.

TABLE 1. THE EFFECT OF INSULIN ON THE BODY

Insulin Regulation	Effect on the Body
Carbohydrates:	
↑ glucose uptake by muscle and adipose tissue	Lowers blood glucose by increasing the number of GLUT 4 transporters in these cells
↑ Glycogen Synthesis	Turns on Glycogen Synthase, allowing for better glucose storage as glycogen
↓ Glycogen Access	Turns off Glycogen Phosphorylase, reducing use of glycogen stores for energy
↑ glycolysis	Removes glucose from the blood to be made into constituents for biosynthesis
↓ gluconeogenesis	Inhibits enzymes necessary for glucose creation, like PFK-1 and PEPCK
Lipids:	
↑ cholesterol synthesis	Acetyl-CoA made from increased glycolysis is used; HMG-CoA Reductase is activated
↑ fatty acid synthesis in the liver	Acetyl-CoA made from increased glycolysis is used; Acetyl CoA carboxylase activated; forms TAG that is sent out into the blood as VLDL
↑ TAG storage in adipose tissue	Activates LPL to remove lipoproteins from the blood

↓ TAG access in adipose tissue	Inhibits intracellular lipase from releasing TAG into blood
Proteins:	
↑ amino acid uptake	Allows for increased protein synthesis
↑ protein synthesis	Reduces the chance for glucogenic amino acids from being used in gluconeogenesis
↓ protein degradation	Disallows the creation of Krebs cycle intermediates; wants muscle to use extra glucose for energy

Storage just allows the body to function between meals, whether that is a few hours or a few days. Therefore, the level of stored nutrients at any given time is regulated by the rate of metabolism. During times of activity, metabolism increases to allow the body to use stored energy at a faster rate. While the body is sedentary or is in an environment of food scarcity, the metabolism slows, allowing for a more sustained use of the energy already received (Frayn, 2001).

As previously discussed, is a risk factor for diabetes, as the body was not made to withstand surpluses of food with little physical activity over long periods of time (Zimmet, 2003). Insulin sensitivity and diabetic control decreases whereas mortality rate increases when the BMI of diabetic individuals exceeds 25 kg/m², a size classified as being overweight (Astrup, 2001; Lew, 1979; Mann, 2000). Scientists have noticed that increased body mass correlates with increased insulin circulation; as insulin levels increase, more free fatty acids (FFAs) are released into the blood. These circulating FFAs block insulin-targeted receptors, contributing to a resistance to insulin (Bergmann, 2000; Schwartz, 2005). Insulin resistance is further propagated by the accumulation of specific glucose- and insulin-regulation proteins (adipokines) secreted by adipose tissue that have deleterious effects on insulin sensitivity (Rajala, 2003). If obesity progresses and insulin resistance sets in, blood glucose levels will remain high and will force the

pancreas to produce more insulin. The ability of β-cells to produce enough insulin to reduce the body's surplus of blood glucose eventually can no longer keep up with demand and reaches a maximum, causing clear hyperglycemia, a condition of consistently high blood sugar levels (Schwartz, 2005). At this point, one is diagnosed as having type-2 diabetes (Nelms, 2007).

According to the Mirriam-Webster dictionary, diet comes from the Greek word *diaita*, meaning "manner of living." A diet determines how the body will function and the quality of life it can sustain. On the most basic level, a proper diet is a specific ratio of macronutrients (carbohydrates, proteins, and fats) that is determined by the body's current metabolic rate. These macronutrients are necessary for metabolism, growth, and as a source of calories. When eaten, macronutrients are broken down into their basic counterparts, transformed into forms more suitable for storage, and released from storage into the body when needed. Since the body has a continuous need for energy, a proper diet ensures that these energy stores are continuously replenished for the body. An energy imbalance, especially one that is ongoing, can weaken or damage the fitness and wellbeing of the body, leaving it vulnerable for chronic diseases like diabetes. The general process of a non-diabetic individual as well as how one develops type-2 diabetes can be seen in Figures 3-1 and 3-2, respectively. To aid in one's comprehension of diabetes and how it propagates throughout the body, increasing awareness and knowledge about the effects that carbohydrates, proteins and fats have on certain body systems is crucial. Interestingly, these macronutrients not only aid in explaining the causal mechanisms for diabetes but also provide insightful clues to assist in primary prevention efforts.

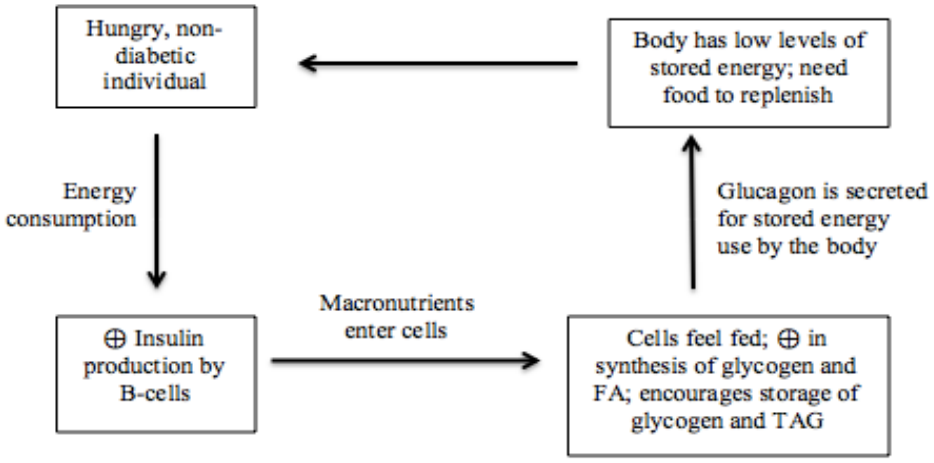

Figure 3-1 **Energy Metabolism of a non-diabetic individual.** When energy supplies are low (individual "feels" hungry), the intake of food is processed and degraded into individual macronutrients. Insulin allows these macronutrients to be taken into the cells for storage as glycogen or TAG or for synthesis as cholesterol or protein. When the body needs energy, glucagon stimulates access and use of glycogen and TAG to supply energy needs. These energy needs are propagated by cholesterol and amino acid degradation, for these supply Acetyl CoA, pyruvate, and CAC intermediates necessary for energy catabolism. When energy stores become depleted, the individual "feels" hungry again.

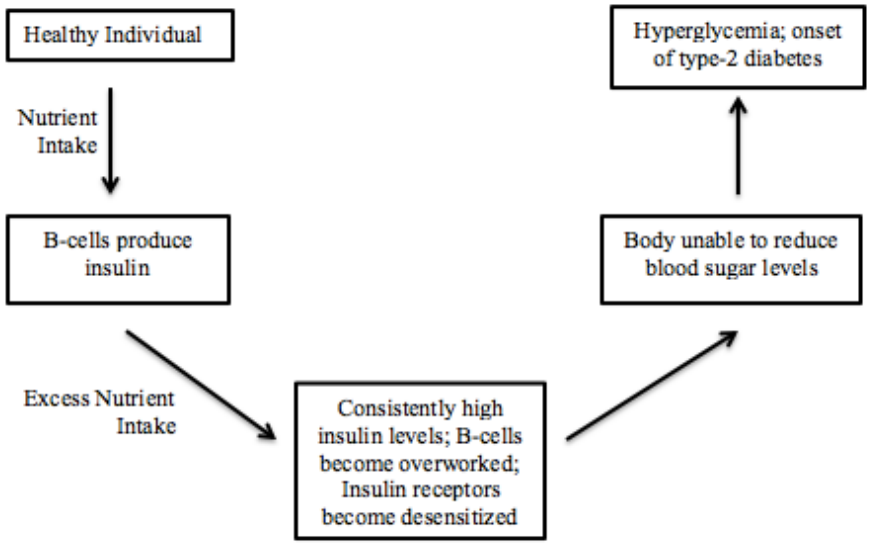

Figure 3-2 **The development of type-2 diabetes.** When nutrient intake becomes excessive over a long period of time, insulin levels remain abnormally high. B-cells are overburdened trying to produce enough insulin to reduce blood sugar levels and eventually die. Insulin receptors become desensitized to the long-term exposure to insulin and fail to surface and respond appropriately. When this happens, homeostatic systems that regulate blood glucose levels shut down, resulting in hyperglycemia and the onset of type-2 diabetes.

3.1 CARBOHYDRATES

Carbohydrates account for most of the energy demanded by the body and are, therefore, needed in the highest amounts (Mann, 2004). Emitting four calories per gram, carbohydrates are the main source of fuel for the body and require very little energy to break down. All tissues and cells throughout the body can use glucose, the most basic form of carbohydrates, for energy; and when not needed, carbohydrates can be stored as glycogen in the muscles and liver (McKinley Health Center, 2008). At a molecular level, carbohydrates are comprised of only carbon, hydrogen, and oxygen and are found as single, six-carbon rings called monosaccharaides or in longer, more complex chains of monosaccharaides. Glucose, fructose, galactose, and ribose are all monosaccharaides readily found circulating within the body. Disaccharides, a carbohydrate molecule made up of two monosaccharaides, are most commonly found in foods such as sucrose, lactose, and maltose. Examples of longer chains of monosaccharaides, called polysaccharides, are cellulose and starch, both found in plants; and glycogen, the storage form of carbohydrates in the human body (Frayn, 2001).

During digestion, all carbohydrates (except for cellulose) are broken down into monosaccharaides by the time they reach the small intestine. Cellulose (generally referred to as a dietary fiber) is made up of long strands of glucose molecules bound together by a specific type of linkage that human stomachs cannot digest and will, thus, continue through the digestive system unused (Frayn, 2001). The small intestine then absorbs monosaccharaides and ships them via the blood to the liver for use. When energy is needed, glucose becomes involved in a chain of metabolic events that ends in the creation of 32 molecules of adenosine triphosphate (ATP), the energy currency that

the body uses to function. When energy is not needed, glucose is converted to glycogen by a process called glycogenesis and is stored in the liver and muscles for later use.

After an intake of carbohydrates, the concentration of glucose in the blood rises (Frayn, 2001). Cells in the pancreas called β-cells secrete insulin when the body has higher-than-normal blood glucose levels in an attempt to restore blood sugar to normal amounts (Rhodes, 2005; Schwartz, 2005). Insulin achieves this homeostatic balance by directing a variety of energy control mechanisms within liver, muscle, and adipose cells like increasing these cells' abilities to take in glucose from the blood and converting a small portion of this glucose into glycogen for storage. It also increases the rate of glycolysis and activates fat storage, giving the body an ample supply of ATP energy molecules when needed to carry out muscle movements and other important cellular interactions.

Diabetics, however, have a compromised response to an increase in blood glucose levels. Due to reduced production of and response to insulin, diabetics are unable to utilize insulin as a means to regulate blood glucose homeostasis. Once food has been ingested, blood glucose levels become exaggerated compared non-diabetic individuals, and the body's ability to return to normal glucose levels is drastically delayed (Frayn, 2001).

A diabetic's ability to control blood sugar levels is not completely futile. Some studies have shown that people diagnosed with type-2 diabetes can assert better control over their blood sugar levels by regulating the types of carbohydrates they ingest (Coe, 2010). The two ways to achieve such control is (1) using the glycemic index (GI) when choosing carbohydrate foods and (2) increasing one's intake of dietary fiber. GI is a

classification system used to determine how quickly glucose is released into the bloodstream following the consumption of food (Coe, 2010; Jenkins, 1981). GI foods are determined by two separate factors: the type of carbohydrate and the digestion rate. The rate of digestion varies based on differences in the physical form of foods, such as whether or not grains have been ground into a powder form, how ripe the food is, and how the food was prepared (Wolever, 1990). For example, foods that have been crushed often provide a greater surface area for access to digestive enzymes than compared to foods that have been compacted, like pasta (Jenkins, 1983). Low GI foods include beans and whole grains and, when compared with high GI foods, have been found to break down more slowly during digestion, providing a more gradual release of glucose into the bloodstream (Coe, 2010). Scientists have performed dietary studies on the effects high and low GI foods have on the overall health of individuals, but results tend to vary between study participants on different days, making it difficult to accurately determine its level of importance to health (Fontvieille,1988; Giacco, 2000; Luscombe, 1999). These discrepancies have also been seen in research on the effects of GI foods on type-2 diabetes (Institutes of Medicine, 2005). However, the concept of GI still has important nutritional value for it is helpful in encouraging the consumption appropriate carbohydrate-rich and high fiber foods like beans and whole grains (British Nutrition Foundation, 2005).

Dietary fiber is a polysaccharide molecule that cannot be digested by the human body but can be used to regulate blood sugar levels. As previously mentioned, dietary fiber is a non-digestible polysaccharide found in plants. Naturally occurring foods like vegetables, fruits, legumes, and wholegrain cereals are high in fiber and should be eaten

in enough amounts to allow for 40g of fiber per day (Mann, 2004). Diets that are high in fiber have been shown to reduce daily blood sugar levels by 10-15% and blood sugar levels after meals by 25%, and delayed glucose release has been pinpointed as evidence for fiber's beneficial effects on type-2 diabetes (Riccardi, 1984). Furthermore, dietary fiber intake has been shown to be less in obese men and women and as opposed to fiber intakes in lean individual. These findings are supported by studies showing that high fiber diets result in significantly lower BMIs for men and women due its low energy density or lower amount of energy per volume of consumed food (Appleby, 1998; Birketvedt, 2000; Miller, 1994; Yao, 2001).

3.2 PROTEINS

Proteins are long, polypeptide chains of amino acids that provide four calories per gram and should account for 10-30% of one's dietary intake (Institutes of Medicine, 2005). The amino acids that make up proteins are divided into two categories: essential and non-essential. The nine essential amino acids are amino acids that the body cannot synthesize by itself and can, therefore, only be received from the diet (Laidlaw, 1987). Meat from animals contains all of the essential amino acids whereas vegetarians must eat a variety of vegetables and legumes to obtain the same essential amino acids. Foods that are high in protein include all types of meat, milk, cheese, legumes, and certain vegetables (McKinley Health Center, 2008). When ingested, proteins are denatured, or weakened, by stomach acid and the stomach enzyme pepsin, and are broken down into short chains of amino acids by enzymes called proteases while in the small intestine. Then, the amino acids are absorbed into the bloodstream where they then travel to the

muscles for use, the liver to undergo transamination into glucose, or converted to fat for storage. Each of these pathways depends on the current metabolic state of the body.

Protein is known as the principle structural material of the body, for it is found in the cell membranes that give cells their shapes. The bulk of protein, about 40%, is found within skeletal muscle and works to build the contractile aspect of muscle (Frayn, 2001). The majority is used to bolster the immune system, provide the equipment to make hormones and enzymes, and serve as an energy source when carbohydrates are no longer available (McKinley Health Center, 2008). As for diabetics, some research studies have suggested that amino acids can stimulate insulin secretion (Floyd, 1966; Frexes-Steed, 1990). However, not enough long-term studies have been performed to determine the effects that protein and amino acids in the diet have on diabetic regulation.

3.3 FATS

Though fat has been pinpointed as a main factor in weight gain, it is still an essential nutrient for many processes of the body (McKinley Health Center, 2008). The United States Department of Agriculture (USDA) has estimated the Acceptable Macronutrient Distribution Range, a range of adequate nutrient amounts in one's diet, at 20-35% of total energy (Institutes of Medicine, 2005). Yielding nine calories per gram, fats are the most energy rich of the three macronutrients and are, therefore, needed in lesser amounts than carbohydrates (McKinley Health Center, 2008). Since more energy is gained from less molecules of fat, a higher amount fat is stored in diets with high fat consumption, leading to a rapid increase of adipose tissue and circulating fats. In fact, any excess macronutrients are stored as fat. Thus, fats must be monitored to prevent

obesity and high circulation of bad fats like cholesterol that can cause further health complications.

Fats, often referred to as lipids, are separated into specific groups. Triacylglycerol (TAG) are lipids made up of three fatty acid chains connected by a molecule called glycerol. The other two groups, phospholipids and steroids, are involved with membrane formation and hormones, respectively, but will not be discussed in this section. Due to the hydrophobicity of the fatty acid chains in triacylglycerol molecules, triacylglycerol works very well as energy storage, making them the primary form of fat that is digested as well as the preferred form of fat storage inside the human body (Frayn, 2001). The fatty acid chains that make up dietary TAG can come in a variety of forms, including types containing no double bonds, one double bond, or multiple double bonds.

The fatty acid chains of dietary TAG are very important for metabolism. However, in order for them to be used, the gallbladder secretes bile salts that act as an emulsifier to convert the dietary TAG into small droplets that can be absorbed. Pancreatic lipase breaks down the TAG into three individual fatty acid chains. The fatty acids are then packaged into TAG-holding structures called chylomicrons, shuttled into bloodstream, and enter cells for use. When the cells need to burn fatty acids, it transports them into the mitochondria and degrades them into carbon dioxide by a process called B-oxidation, ultimately making ATP. If the energy supply of the body is sufficient, fatty acids are stored for later use as TAG in adipose tissue located throughout the body. This process of TAG cycling is described in Figure 3-3.

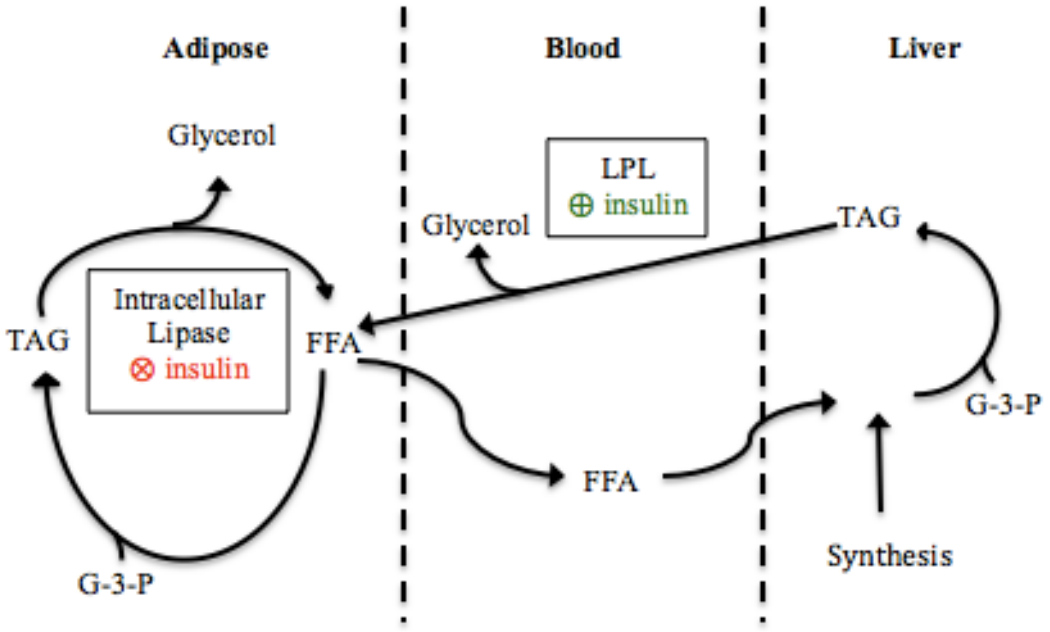

Figure 3-3 **The TAG Cycle.** When insulin is present, LPL takes circulating lipoproteins out of the blood and stores them as TAG in adipose tissue. Insulin also shuts off access to fat stores for circulation and FFA metabolism.

For a healthy individual, fat intake should be monitored and should never be discontinued. Since fat provides humans with energy, energy storage, membrane production, a solvent for fat-soluble vitamins, and insulation, fats are essential for a balanced diet. However, the type of fat one consumes is most important and should be monitored closely. In general, all dietary fats are in a TAG form, the same TAG that comprises adipose tissue inside the body. These dietary TAGs are divided into three groups: saturated fats, unsaturated fats, and trans-fats. Saturated fats are chains of fatty acids that do not contain a double bond and are most often found as solids. Foods with high levels of saturated fats are found in meat, dairy products, and tropical seed oil like coconut oil (Frayn, 2001). The liver can also recycle the fat in unused chylomicron shuttles and produce and excrete saturated fats known as VLDL that maintains adequate

levels for physiological function in times of need (Institutes of Medicine, 2005). High levels of VLDL and LDL, two types of lipoproteins that carry lipids out of storage and into the bloodstream, are good medical indicators of poor health. Studies have shown that an increase in saturated fat consumption inhibits the LDL receptors responsible for lowering LDL concentrations, corresponding to an increase in circulating LDL as well as an increased risk for cardiovascular disease (Mustad, 1997; Spady, 1993). Since no research has established a positive role in preventing chronic diseases like diabetes, consumption of saturated fats should be fewer than 10% of total energy intake (British Nutrition Foundation, 2005).

Unsaturated fatty acids can come in two forms: monounsaturated fat and polyunsaturated fat. Monounsaturated fats contain only one double bond whereas polyunsaturated fats contain two or more double bonds. Though they are two different types of fats, both are found simultaneously in a variety of foods. Olive oil and peanut oil contain a higher amount of monounsaturated fat than polyunsaturated fat, and nuts, seeds, and fish oils contain more polyunsaturated fats. The health impact of unsaturated fatty acids are much better than those for saturated fats. Substituting sources of monounsaturated or polyunsaturated fat for saturated fatty acid sources has been shown to provide beneficial effects on blood lipid concentration (Howell, 1997). However, moderation is key to ensure a healthy lifestyle. Double bonds have a tendency to oxidize and become rancid if left undigested, creating free radicals that deplete antioxidant stores within the body. This means that diets high in polyunsaturated fats can have deleterious effects on the body's ability to stay healthy (Watkins, 2001). Also, some studies have shown that diets with excessive monounsaturated fats promote atherosclerosis due to

heightened amounts of fatty acids in the blood (Rudel, 1997; Vogel, 2007). It is important, therefore, to understand that though unsaturated fats are beneficial at controlling lipid levels in the blood and are nutritionally better than saturated fats, fat, in general, should still account for less than 35% of one's total energy intake (British Nutrition Foundation, 2005).

The last type of unsaturated fat is trans-fats, which are unsaturated fats that have mutated into a different configuration or shape. Naturally occurring unsaturated fats have a cis-orientation, meaning that the molecule bends towards itself, like the letter "C." In trans-fats, however, the molecule takes the shape of the letter "Z", disrupting the natural, physical properties of the fat molecule (Institutes of Medicine, 2005). Partial hydrogenation of oils can cause isomerization of the fat molecules, resulting in a mixture of unsaturated fats and trans-fats; and foods cooked in partially hydrogenated oil contain higher amounts of trans-fats (Emken, 1995). Like saturated fat, increased trans-fat intake also shows a positive correlation with an increased risk for coronary heart disease (Ascherio, 1999), and other studies have found that trans-fats act to increase LDL concentrations while lowering HDL concentrations (Mensink, 1990). HDL is another type of lipoprotein that takes cholesterol out of the blood and into the liver for degradation, so having high HDL levels is very valuable in maintaining a quality level of health. Trans-fat, unfortunately, is almost impossible to avoid in foods cooked in partially hydrogenated oils or in diets that contain meat and dairy products. Therefore, it is recommended to choose diets that allow the lowest amounts of trans-fat (Institutes of Medicine, 2005).

Fats have been shown to both cause and help regulate negative effects associated with type-2 diabetes, namely, insulin insensitivity. It is easily understood that an increase in fat intake results in an increase in fatty acid oxidation and an increase of enzymes specific for this process. Yet, two enzymes in this process have inhibitory effects on the glycolytic pathway, the primary means of carbohydrate metabolism, which noticeably reduce the efficiency of insulin to stimulate the surfacing of glucose receptors (Randle, 1963). Excessive fat intake also contributes to weight gain and obesity, leading to the insulin regulatory problems previously mentioned. However, the type of fat ingested can prove beneficial to insulin sensitivity in people with type-2 diabetes. According to the KANWU study, eating more saturated fats and less monounsaturated fats impaired insulin sensitivity and was improved when the fats were reversed (Vessby, 2001). This result was also seen with replacing saturated fats with polyunsaturated fats (Howell, 1997). Even so, these studies analyze long-term intake patterns of dietary fat. As for fat's short-term effects on insulin sensitivity, studies generally demonstrate no effect of saturated fat on insulin sensitivity (Fasching et al., 1996; Roche et al., 1998; Thomsen et al., 1999).

In diabetic individuals, the body responds to its inefficient use of glucose for energy by amplifying processes associated with fatty acid metabolism. This shift in metabolic focus causes fat to become the primary source of fuel and reduces the body's ability to burn any excess glucose, creating a dramatic rise in blood glucose levels (Frayn, 2001). Since insulin levels remain high in hyperglycemic individuals, the body is in a constant desire to store extra energy, as shown in Figure 3-3. Also, since insulin receptors are not working, the body assumes that there is a lack of glucose to use for

energy. In response, the liver creates cholesterol and fatty acids from glucose and sends these products into the blood stream as VLDL in an attempt to feed parts of the body unable to rescue glucose from the blood. However, insulin receptors still continue to work in adipose tissue and actively attempt to store circulating lipids, causing rampant weight gain and increased secretion of dangerous adipokines. For non-diabetic individuals, these processes are used to lower the levels of glucose back to normal levels in a safe way that does not waste vital energy. For diabetic individuals, on the other hand, their regulatory systems actually propagate a vicious cycle of insulin resistance and weight gain.

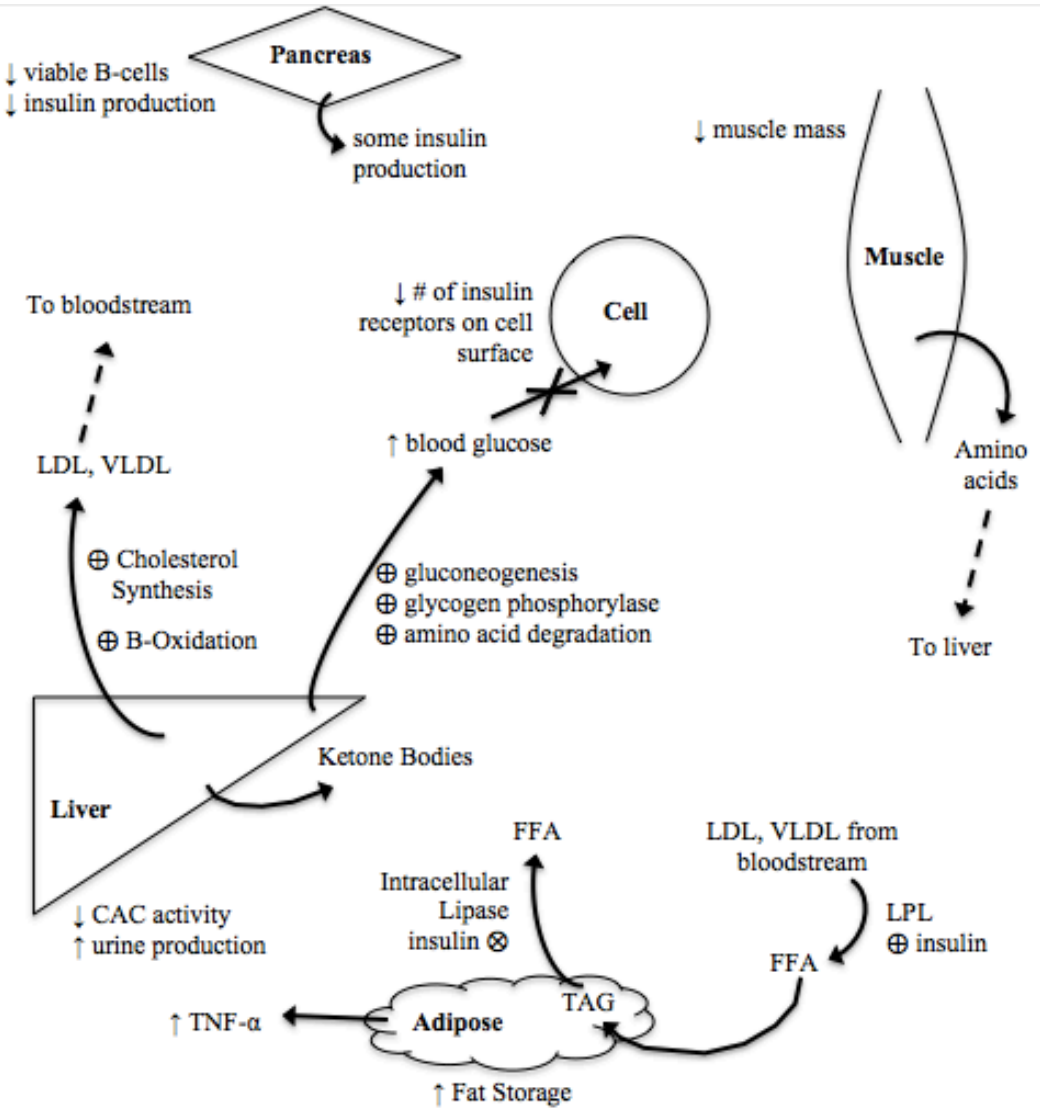

Figure 3-4 **Type-2 Diabetes and the Body.** When the body is in a chronic overfed state, production and sensitivity to insulin decreases in the body. The number of insulin receptors on the cell surface diminishes, disallowing glucose from entering the cells. Therefore, body tissues "feel" hungry, and processes that increase the availability of food to the tissues are up-regulated, further increasing blood glucose levels. However, insulin receptors in adipose tissue are not affected by high insulin levels and operate normally by storing excess energy as TAG. This extra storage increases fat storage as well as the production of the adipokine TNF-α. TNF-α further destroys insulin receptors in other cells.

3.4 Appropriate Diets

Now that a firm understanding of the essential nutrients and the metabolic roles they serve in type-2 diabetic and non-diabetic individuals, it is helpful to combine this

information and begin looking at the broader spectrum of diet when determining the most appropriate approach for one's dietary choices. From the above information, it apparent that carbohydrates and fats are the main nutrients that can disrupt normal metabolic processes and exacerbate complications associated with type-2 diabetes. Therefore, monitoring the types and amounts of carbohydrate and fat intake can make a meaningful impact on preventing type-2 diabetes.

3.4.1 Dietary Energy Density

The concept of dietary energy density discussed with fiber can be extended to also include other types of macronutrients. In broad terms, foods high in energy density provide high amounts of energy in a small volume of food. Energy density is often based on the water content of food because water has an energy density of zero. The more water found within a specific volume of food, the less space available for energy-supplying macronutrients. Fiber can also manipulate the energy density of food due to its ability to bind water and take up space. Foods with high energy density have been found to be tastier but less filling and are often made with added sugars and fats. Low energy dense foods, like fruits and vegetables, are more filling but less palatable (Drewnowski, 2003). Studies have also shown that consumers often base their food intake on volume and a feeling of satiation rather than on energy density. Foods that have a low energy density provide little energy for the amount consumed and must, therefore, be eaten in bigger portions to achieve a certain energy goal (Duncan, 1983). Because of this, people will often feel full and stop eating before the energy goal is reached, allowing for lower blood sugar levels, lowered need for energy storage, and a longer feeling of fullness (Bergmann, 1992). Since weight gain is contrived by excess energy intake, energy dense

diets like those with high-fat and high-carbohydrate contents contribute more to weight gain (Ledikwe, 2006) because the feeling of fullness often follows a surplus of energy intake. These energy dense diets have also been found to be associated with higher baseline insulin levels and great predictors of type-2 diabetes onset, even when negating BMI, total energy and fat intake, and lifestyle factors like exercise (Mendoza, 2007; Wang, 2008).

Many research studies from across the world have pinpointed that the Mediterranean diet provides the appropriate amount of nutrients to lose weight and provide better glycemic control (British Nutrition Foundation, 2004; Esposito, 2009; Politakndrioti, 2009; Salvadó, 2011). The Mediterranean diet is defined as a high consumption of plant foods, using olive oil as the principal fat, and consuming low to modest amounts of dairy and meat (Willett, 1995). Using the plant foods as the primary nutrient source, the Mediterranean diet allows the body better glycemic control from these low-energy dense foods as well as a beneficial delay in glucose release. Olive oil as the primary source of fat not only establishes a higher monounsaturated fat to polyunsaturated fat ratio that reduces the risk of disease from lipoprotein oxidation but also provides higher levels of HDLs when used in place of carbohydrates. Lastly, saturated fat consumption often associated with higher VLDL and LDL concentrations is lowered due to a minimal focus on meat and animal products.

Therefore, focusing on dietary energy density when making nutritional choices can benefit one's overall diet. In a Finnish study, energy dense diets that are high in fat but low in fiber contributed to an 89% increased risk of developing diabetes when compared to a low-fat/high-fiber diet (Lindstrom, 2006). In the Wang study, less energy-

dense diets consisted of high plant intake and low meat intake, giving further credence to the success of the Mediterranean diet in reducing the incidence of type-2 diabetes (2008).

3.5 Nutritional Boundaries Mississippi

Maintaining a healthy diet in Mississippi can be difficult due to an assortment of factors such as food preparations and common food choices that make up traditional Southern cuisine as well as poverty and food insecurity that plagues many areas throughout the state (Pearson, 1998; Seligman, 2007). These economic factors may lead people to be more conscientious about the price of food than to its nutritional value and may be contributing substantially to the poor general health of many Mississippians.

3.6 The Southern Cuisine

The central pillar of Southern cultural identity in the 21st Century is food (Latshaw, 2009). A fusion of European, African, and Native American cuisines, Southern food retains a rich history that has the power to connect generations of many different backgrounds (Ferris, 2009; Mead, 1980). The basic principles of fat, sugar, and salt are common for many Southern food preparations, and this combination has been suggested as one of the main contributing factors to increases in obesity and type-2 diabetes incidences in the Southern population (Bovell-Benjamin, 2009; Kulkarni, 2004; The Economist, 2007; Tucker, 2005).

To gain a better understanding of the types of foods commonly associated as being "Southern," many nutritionists have worked to develop food lists from focus group interviews and food frequency questionnaires (Bovell-Benjamin, 2009; Jefferson, 2010;

Tucker, 2005; Weinrich, 2007). Food items commonly claimed as "Southern" that had to be added in a variety of studies include biscuits, cracklings, fried beef, fried catfish, turnip greens with 'pot likker,' neck bones, okra, pig parts, sweet potato pie, and grits (Bovell-Benjamin, 2009; Tucker, 2005). As for top contributors to energy intake, soft drinks contributed most to energy intake in African Americans of the Lower Mississippi Delta (LMD), followed by white bread, and fried chicken (Subar, 1998). High-fiber cereals ranked below white bread, salty snacks, and French fries in food sources most commonly consumed for fiber intake (Tucker, 2005).

In a 2009 study of 61 African Americans in Macon County, Alabama, the most common cooking method reported was frying, especially with chicken. Almost 81% of these African American men answered that they had eaten fried chicken and 67% had eaten fried fish during a three-month food recall conducted in 2007 with 204 African American males living in a Southern state (Bovell-Benjamin, 2009; Jefferson, 2010; Weinrich, 2007). When cooking at home, very few claimed to remove the skin before cooking chicken (Bovell-Benjamin, 2009; Weinrich, 2007). As for vegetables, 55.9% of obese men reported sometimes eating vegetables cooked with butter, margarine, or fatback (Bovell-Benjamin, 2009; Weinrich, 2007). Turnip greens were often prepared with ham hock or salted meats (Jefferson, 2010). The high rate of consumption of fried meat, retention of animal skin, and food preparation with animal fats contributes to a much higher percentage of daily saturated fat and potential trans-fat intake.

It is evident that Southern foods and common preparation techniques can contribute to increased type-2 diabetes rates in the Mississippi population. However, dietary change may be challenging for many African American Southerners for several

reasons. First off, many perceptions of what is considered healthy have been misconstrued; many participants in one study believed that fried chicken was a healthy option if it had been fried in vegetable oil (Jefferson, 2010). Secondly, social factors, which will be discussed later, have made it difficult for African Americans to part ways from traditional cuisine (Kumanyika, 1992).

3.7 African American "Soul Food"

Although food is important for all Southerners regardless of race, African Americans have used food as a means of cultural identity and as a tribute to those who suffered during black oppression (Henderson, 2007). Coined "Soul Food," traditional African American food gained popularity during the 1960s, a decade riddled with racial discord, in order to reconnect with former slaves through a common diet. The traditional definition of soul food contains three important characteristics: a connection to Africa and to the diets of enslaved ancestors, an innate connection with the black self, and a mainstay to black identity (Van Deburg, 1993; Witt, 1999).

Food products like ham hocks and chitterlings were the leftovers of pigs that slave owners used to feed bondsmen; fried chicken and okra were foods commonly found among African tribes (Baraka, 1966; Van Deburg, 1993). Soul food has not only helped bring African Americans closer together as a community but has also helped define and enrich the food choices most commonly seen on many dinner tables in the South. Unfortunately, these strong traditions have also created a unique obstacle in achieving meaningful success from health interventions (Jefferson, 2010; Kulkarni, 2004). No matter the level of education and income, southern-born African Americans tend to have

poorer diets than other African Americans partially due to a reluctance to alter traditional eating behaviors. In a 1998 study in Harlem, southern-born blacks were found to have higher-risk diets than other black citizens (Greenberg, 1998). Elderly African American women in the South consumed more meats than breads, vegetables, and dairy products (Lee, 1998). Changing traditional food preparation techniques, like frying or cooking with animal fat or omitting unhealthy food options have been found to result in feelings of deserting one's cultural identity (James, 2004). Therefore, it is crucial for the future success of type-2 diabetes intervention in the African American population to understand and utilize the power of culture and community to instigate change while recognizing the importance and value of cultural identity in the context of cuisine.

4. Poverty and Health

In the United States, rates of obesity and type-2 diabetes correspond to a socioeconomic gradient, of which racial minorities and poor populations comprise a disproportionate share of those severely affected by both of these health problems (Flegal, 2002; Schoenborn, 2002; USDHHS, 2010). This phenomenon between health and socioeconomic status that unequally impacts racial minority and impoverished communities can be traced to limited access to affordable nutrient-rich foods (Connell, 2007; McGee, 2008; Stuff, 2004). As the energy density of food increases, energy costs decrease, but so does the nutritional value of foods. Per calorie, foods such as grains, sugars and fats are much cheaper than fruits and vegetables. The mean energy cost of vegetables, in fact, was found to be almost five times higher than that of grains and fats and twice as much as the cost of sugar (Drewnowski, 2004; Drewnowski, 2010). Diets based largely on energy-dense foods contain more added fat and sugar than energy-dilute diets and often involve more fast food consumption (Drewnowski, 1998; Marti-Henneberg, 1999). Therefore, people living on low incomes often attempt to lower the amount of money spent on food by deliberately purchasing less expensive but more energy dense products (Drewnowski, 2004; Lutz, 1993). The goal of such a strategy is to provide a larger, more varied meal instead of focusing on supplying the nutrients essential to a healthy life (Basiotis, 1998; Glanz, 1998; Seligman, 2007). Such long-term

consumption patterns contribute primarily to excess energy consumption, lower essential nutrient intake, and consistently high glucose levels.

Mississippi led the nation with having the highest poverty rates in 2011, with 21.2% of the population at or below the federal poverty line (US Census Bureau, 2010); and many studies have linked poverty in rural Mississippi with increased burden of chronic disease (LMDNIRC, 2004; Pearson, 1998; Smith, 1999). Much of Mississippi's poverty is centered near the Mississippi River Delta, an area of Northwestern Mississippi that lies between the Mississippi and Yazoo Rivers (US Census Bureau, 2010). The LMD, defined by 36 Mississippi, Louisiana, and Arkansas counties that border the Mississippi River, is a region with 51% of the population being African American and 35% of its residents at or below the federal poverty line (US Census Bureau, 1996). Studies in the LMD reveal a disproportionate percentage of the population that suffers from type-2 diabetes and obesity, 10% and 33.9% respectively, almost doubling the national averages of 5.6% for diabetes and 17.3% for obesity (LMDNIRC, 2004). A recent interview by NPR of an unemployed 26-year old woman highlights the struggle that many Mississippi Delta residents face in having no choice but to provide cheap, unhealthy food to feed their families:

> "If you have two children to feed and you don't have but $5, you are going to try to get a whole meal for the money that you have. Therefore, you might have to buy something that's not as healthy as you want it to be in order for you and your children to have something to eat" (Elliot, 2011).

Inflated obesity and type 2-diabetes rates found within the LMD, consequently, could be a result from families buying cheap energy-dense foods to get the most food for their money.

4.1 Food Insecurity and Health

The ability to find and purchase nutritious food is, unfortunately, limited not only by poverty but also by location of grocery stores and supermarkets. Food insecurity is often defined as an inability to purchase adequate amounts of nutrient-dense foods. In 2010, 9.1% of U.S. households were considered food insecure and not starving whereas 5.4% were deemed as have *very low food security* (USDA). Known also as food deserts, these places have at least 50% of the population with poor access to a supermarket and an insufficient quantity or selection of healthful food (Powell, 2007; Treuhaft, 2011). Approximately 16% of U.S. citizens report that they are able to get enough food to eat but were not always able to receive foods that they wanted to eat, suggesting that a lack of money or availability is a major issue for many Americans struggling to provide a healthy meal (USDA, 2011). In 2009, the USDA determined that almost 20% of rural counties live ten or more miles from the closest supermarket; and since supermarkets have the widest variety of healthy food options, many citizens of these rural counties often resort to purchasing less healthy, energy-denser foods at convenience stores or smaller grocery stores (Johnson, 2009; McGee, 2007). Therefore, as a household's distance to a grocery store or large chain supermarket increases, the availability of healthy food options decreases while the incidence of type-2 diabetes in the surrounding population increases (Cohen, 1998; Devine, 1998; Johnson, 2009).

In a 2010 report by the USDA, 19.4% of Mississippians were reported as being food insecure, the highest percentage of any state and almost 10% higher than the national average. Out of the 82 counties in Mississippi, 26 of them are classified as food deserts. Six of these 26 counties are located in the Mississippi Delta (Blanchard, 2006; Delta Council, 2012). Over 70% of food stamp eligible Mississippi households must travel at least 30 miles to reach the nearest supermarket (Kaufman, 1998; Morton, 2007). In the LMD, 73.5% of a selected list of fresh vegetables were found in most supermarket stores and packaged in a variety of ways, but only 4.5% of these choices were found in convenience stores and often only provided one package type. The results for frozen and canned options were similar (Johnson, 2009). Lower access to fresh produce has been linked to lower consumption and poorer overall diets (Blanchard, 2006; Johnson, 2009; Moore, 2008). Poor diets that lack the nutrient density found in fresh produce often are high in energy density; if left unregulated, these types of diets will lead to obesity and type-2 diabetes.

Looking more specifically at the types of food less frequently eaten due to food insecurity elucidates the reasons type-2 diabetes has become such a problem in poor areas of Mississippi, particularly among racial minorities. Consumption of dietary fiber was significantly lower than the national average in LMD white and black adults whereas intake of foods with added sugar and fat was higher among adults in the Delta, due to a lack of fresh vegetables and whole grains in the diet (Champagne, 2004). The proportion of women in low-income areas eating salads and fruit on any given day was almost half than women in a higher-income status but intake of basic foods like milk, meat, and grains varied little between income groups (Wilde, 2000). A lack of fiber or consuming

high amounts of foods with added sugars, as discussed earlier, results in sharper spikes in blood glucose levels and forces the body to work harder in reducing these levels.

5. TYPE-2 DIABETES AND EXERCISE

The positive impact that exercise has on type-2 diabetes risk was first recognized by Aristotle when he discovered that diabetic symptoms improved dramatically after some amount of exercise (Polikandrioti, 2009). However, research has shown that only 39% of adults with diabetes exercise regularly (Ford, 1995; Morrato, 2006). In studies where diet and exercise regimens were implemented for high-risk individuals, the risk of developing diabetes was reduced by 58%, better than a medication-only intervention or a dietary intervention without exercise (Knowler, 2002). Such a finding sheds light to the benefit of a simple but consistent change in diet and exercise can be in preventative health over prescription-only strategies. In a separate study that required individuals to have at least four hours of moderate to vigorous physical activity per week (but did not mandate participants to lose weight), researchers found a 70% reduction in the risk of developing type-2 diabetes, suggesting that exercise alone can prove beneficial in preventing the onset of diabetes (Tuomilehto, 2001).

It is important to note that the type and frequency of exercise should be determined on a case-by-case basis. While studies have highlighted the vast health benefits of physical activity, an exact recommendation of the amount and intensity has not been clearly defined (Polikandrioti, 2009; Yamanouchi, 1995). One study found that an intensive dietary and exercise intervention with drastic intake limitations and high frequencies of moderate to vigorous exercise increased insulin sensitivity by 23% but

such an extreme lifestyle change might be too difficult for many to achieve (McAuley, 2002). Since exercise affects many aspects that are associated with glucose regulation and long-term diabetes can reduce one's ability to perform certain exercises, it is important to receive medical guidance and prescreening to insure one's safety as well as the maintenance of proper glucose levels (Sato, 2007; Sigal, 2004).

At the molecular level, it is important to recognize the benefits of exercise in maintaining healthy functioning and reducing the incidence of type-2 diabetes. The physical movement of muscle requires energy, and the body uses dietary glucose and FFAs derived from the diet to supply this energy. Therefore, instead of the body storing this excess energy or creating the cardiovascular problems that result from too many FFAs in the blood, the body uses it first and withholds the use of stored energy for later. Studies have found that moderate exercise increases the amount of insulin receptors on the outside of muscle cells, contributing to a increase in glucose uptake seven to twenty times higher than normal baseline rates (Douen, 1989; Hayashi, 1977; Sato, 2003). If exercise follows a meal, diabetic individuals should be able to suppress the surge of blood glucose and reduce the stress on β-cells and insulin receptors. In fact, the amount of steps one takes each day has a positive correlation to an increase in the glucose metabolic clearance rate from the blood (Yamanouchi, 1995). As the intensity of exercise increases to moderate levels, the utilization of carbohydrates and release of FFAs from adipose tissue increases. However, it is important to not exceed the lactate threshold, a point when lactate begins to form in the bloodstream due to a lack of oxygen reaching the muscles, because the body will be forced to get energy from carbohydrates through anaerobic metabolism and will be unable to burn FFAs (Sato, 2000). Since

adipose tissue releases chemicals that inhibit insulin sensitivity, it is crucial to focus mostly on aerobic exercise routines that promote optimal FFA utilization and weight loss (Sato, 2005).

In addition to the lack of nutritious food choices, many Mississippians are not exercising enough to counter-balance their energy intake amounts and regulate their blood sugar levels. As mentioned earlier, Mississippi had the highest rate of general leisure-time physical inactivity in 2008, and in 2010, 48.1% of diabetic Mississippians were listed as being physically inactive (CDC, 2012). Some have linked such inactivity, not to laziness, but to an inability to find the time and energy to engage in exercise, and these results are not limited only to Mississippi residents, either. In a study comparing physical activity between urban and rural women, participants residing in rural areas were less likely to exercise because of barriers such as caregiving duties, lack of time, lack of energy, a lack of sidewalks, and a lack of safe places to exercise (Wilcox, 2000). Further distance to recreational facilities has also been related to obesity, a problem that parallels earlier discussions of low access to supermarket and obesity (Boehmer, 2006; Hill, 1998). Stress from income disparities and heightened violence rates in poorer communities have also been found to have a positive correlation with obesity and type-2 diabetes (Hsieh, 1993). Approximately 21.8% of Mississippians live below the poverty level, and this lack of income and perceptions of safety may make it much more challenging financially to afford membership to gyms, purchase exercise equipment, or exercise outdoors (Kahn, 1998; Levine, 2011; MS QuickFacts, 2011).

6. The Black Church and the African American community

The African American church is more than just a place of spiritual reflection and maturation – it is viewed as a center for social, educational, economic, and political support (Frazier, 1964; Wielhouwer, 2004). Many have cited the church's widespread, ingrained involvement in the African American community as a main factor for the church's continued popularity and importance. Furthermore, research validates this popularity, consistently showing that African Americans attend church services and church functions more regularly than white adults (Chatters, 2009; Glenn, 1964; Hunt, 1999; Lincoln, 1990). According to the 2008 U.S. Religious Landscape survey, 87% of African Americans practice some form of religion, with 45% of them stating Christian-Baptist as their primary denomination. Approximately 85% of these African Americans mentioned that religion was "very important in their life," almost 30% more than the overall U.S. average (Pew Forum). In a 1995 study, more rural, southern African Americans attend church at a higher overall percentage than do urban or non-Southern African Americans and are 15% less likely than urban Southerners to claim disaffiliation with a spiritual organization (Ellison, 1995). Inspired by segregation and fueled by cultural pressures, the Black Church has developed a unique reputation of unity and communal support that could prove beneficial in tackling type-2 diabetes in Mississippi (Ellison, 1995).

One aspect of the Black Church that is important to consider in the context of this study is its popularity in the South as compared to non-Southern churches (Taylor, 1991). In the 1700s, regional variation within the Black Church emerged from slave traditions in the South and continued to become more pronounced as the South underwent a number of strained, racially driven conflicts like Emancipation, Reconstruction, the Jim Crow era, and Southern urbanization (Fraizer, 1974). During segregation and periods of racial exclusion, the Black Church was the only major organization started and maintained by African Americans for the unity, support, and protection of its African American followers. It was a means of escape, a way to achieve community status, and the primary supervision in African American rites of passage (Nelsen, 1971). Through its early cultural importance, it quickly developed into a body that became active in mutual aid, advancing the welfare of the African American population, and encouraging political activism (Frazier, 1974; Lincoln, 1990).

Some view the prominence of church attendance in the contemporary South as being based on a "semi-involuntary" principle, stating that decisions for Southern African Americans about church participation and involvement have been dictated by social and cultural norms and not by personal choice (Ellison, 1995; Hunt, 1999). In fact, community surveys indicate that even though studies show some form of regular religious participation among Southern African Americans, it is due, not only to only personal satisfaction or benefit but also from expectations by the community (Ellison, 1990). The relative lack of secular support organizations for African Americans in the South has also lead to a greater reliance on the church for guidance outside of the spiritual realm (Ellison, 1995). However, as more secular support groups become

available in the South, the Black Church has been forced to become more proactive and offer similar programs for their congregations. Many churches have experienced growth as a result of secular expansion, and these attractive and practical programs have become a near necessity for 21st Century Black churches in order to maintain high participation levels (Barnes, 2009; Ellingson, 2007; Shaller, 2000).

6.1 The Black Church as a Setting for Health Intervention:

From the preceding section, it is apparent that a primary role of the Black Church is to be a place of comfort and trust for many African Americans. Black Churches often provide the necessary social framework that encourages people to positively adjust their values and behaviors, and it is this ability to instigate beneficial change within a loyal following that has established the relatively recent surge of church-based health initiatives (Peterson, 2002; Resnicow, 2000). Yet, the link between health and spiritual healing is nothing new (Peterson, 2002). Florence Nightingale often utilized holistic approaches, emphasizing the need to respect the spiritual, the mental, and the physical health of a patient (Nightingale, 1860). Starting in the early 20th Century, however, scientific knowledge and the success of prescribed medications rapidly increased, drastically undermining the connection between spiritual and physical health (Peterson, 2002). Furthermore, the medical community is often perceived as turning its back on the African American population, resulting in a large underserved population and a general mistrust in the healthcare system (Jones, 1993; Levin, 1984; Rosser, 1993). Historical cases of deceit and malpractice such as the Tuskegee study and current instances of stereotyping and prejudice from White healthcare providers have created rifts between

white doctor-black patient relationships (Smedley, 2003; White, 2000). Also, African Americans seeking culturally competent healthcare are often unable to find African American doctors, for only 3% of the one million practicing physicians in the United States are black (Ellis, 2011). Historically, the Black Church has been a highly sought out system of health support for those unable to acquire appropriate health screenings and disease treatment; even today, many will still refer to the minister before seeking medical advice from a certified doctor (Levin, 1984; Plescia, 2004).

The Black Church is considered to be an appropriate partner for public health intervention due to its parallel mission to provide an "ethic of service to others" (Levin, 1984; Markens, 2002). In a 2002 Gallup poll of 729 adult church members, 80% of African Americans feel that religion can "answer all or most of today's problems," which portrays the level of commitment and trust that many African Americans have for their church institutions (Barry, 2006; Crabtree, 2002). The importance of church extends much further than a purely spiritual sense. It has intertwined health and illness with the mind, body, and soul so well that African American church members might not even realize a difference between spiritual worship and physical healing. The inability to differentiate between these two coping methods can, therefore, motivate members to alter normally difficult and frustrating health choices (Gaillard, 2006; Levin, 1984; Musgrave, 2002; Peterson, 2002).

In a more tangible sense, the Black Church provides a center for cultural and social activities, fostering a sense of safety and support as well as valuing the spirit of servicing others (Blocker, 2006; Peterson, 2002; Underwood, 2006). This comfortable and familiar setting, therefore, allows public health intervention to succeed in programs

with improved attendance and service groups, such as older African Americans, who are often harder to reach (Duru, 2010; Irwin, 1997; Taylor, 2004). Women have been found to more likely attend health programs when they are held in churches because they tend to enjoy and value the church experience (Wells, 1990). To the congregation, pastors are often seen as role models, encouragers for healthy behavior, and "the next best thing" to good medical treatment. They serve an extremely vital role in the success of the overall intervention, for pastors can reach and persuade church members to make beneficial health changes in their lives (Markens, 2002; Plescia, 2004).

Many African American churches have successfully hosted church-based health intervention programs, including prostate cancer, HIV, breast cancer, drug use, and arthritis prevention (Barry, 2006; Blocker, 2006; Irvin, 2006; Markens, 2002; Wooster, 2011). Specifically important to this study, African American churches have been found to be valuable settings for diabetes intervention because of its substantial disparity within the African American population and its heightened level of concern among church congregations (Ammerman, 2003; Hoyo, 2004; Mann, 2000). Many studies, which will be reviewed later, have worked to address problems associated with diabetes, like glucose monitoring, physical activity, nutrition, and obesity.

6.2 A Review of Church-Based Interventions

In order to understand the current landscape of church-based and faith-based health interventions, it is necessary to review past research and available data. The University of Mississippi's Online Library research and PubMed were used to find appropriate articles for review. Words such as "church based," "faith based," "African

American," "black," "diabetes," physical activity," "obesity," "intervention," "prevention," "health," "program," and "study" were used in both search engines. Articles that were classified as peer-reviewed and that correctly matched the selection criteria were chosen to be a part of this review. Also, a few relevant studies that were not located in the original search but were referenced in the selected papers were also used for this review. I chose full-text articles published since 2000 that provided a clear description of the methodology as well as those that concluded with some level of statistical analysis. In both search engines, it was difficult to find objective research that provided tested results or articles analyzing the effectiveness of church-based interventions, for many either discussed strategies for the best impact in the congregation or detailed the feasibility of such a program.

Initially, information about each article, including the primary health focus, sample demographics, location of the study, program description, the results, was recorded and outlined in Table 2. In the following section, I will: (1) review church-based studies designed to target diabetes, physical activity, and nutrition; (2) review literature on church-based intervention opinions as well as effective and ineffective church-based implementation strategies, and (3) discuss the lack of church-based health intervention studies in Mississippi.

Table 2: Relevant Studies Assessing Faith-Based Intervention in African American Population						
Study Number	Citation	**Sample Size**	**Location**	**Program Description**	**Health Focus**	**Results**
1	**Wilcox et al, 2007**	571 African Americans from 20 churches	AME churches within 6 regions of South Carolina	Churches randomly assigned PA sessions immediately or 1 year later; Data collection through phone surveys	Physical Activity	-No change in Physical Activity -No change in BMI -Increase in discussion of Health in Church
2	**Duru et al, 2010**	62 African American women from 3 churches (34 active participants, 28 control)	South Los Angeles, California	8 weekly meetings to establish active behaviors; 6 monthly meetings to ensure increases in physical activity	Physical Activity	-No difference in increase of physical activ between intervention and control participar -At 6-month follow-up, intervention partici walked an average of 7,457 more steps tha control
3	**Whitt-Glover et al, 2008**	87 African Americans from 4 churches	Suburban community in North Carolina	3-month intervention with information sessions, instructor-led activity session, and weekly incentives to promote physical activity	Physical Activity	-Change in moderate-intensity PA: +67 mi -Change in vigorous-intensity PA: +44 mir -Change in steps walked: +1373 steps/day
4	**Davis-Smith, 2007**	11 African Americans from a single church	One church in Central Georgia	6-session intervention program led by volunteer healthcare professionals	Diabetes	-Change in fasting glucose: -7.0 mg/dL -Change in weight loss: -7.9 lbs -Change in BMI: -1.3 kg/m²
5	**Boltri et al, 2011**	37 African Americans from 5 African American Baptist churches	Small, rural communities of central Georgia	Two group-based programs, a 6-session program, and a 16-session program	Diabetes	-No difference between 6-session program. -Change in fasting glucose: -6.4 mg/dL -Change in weight: -3.8 kg -Change in BMI: -0.56 kg/m²
6	**Dodani and Fields, 2010**	35 African Americans from 1 church	Augusta, Georgia	12-session Fit Body and Soul program with church ministers as interventionists	Obesity	-48% lost at least 5% of baseline weight -26% lost at least 7% baseline weight -14% lost more than 10% baseline weight
7	**Fitzgibbon et al, 2005**	59 African American women	Hospital of Cook County in Chicago, Illinois	Compared efficacy of 12-week faith-based intervention to culturally tailored intervention with no faith component; both were the same except for scheduled scripture readings on health in faith-based group	Obesity	-Change in weight for faith-based intervent 2.6 kg -Change in weight for Reg Intervention: -1 -Change in BMI for faith intervention: -1.0 kg/m² -Change in BMI for regular intervention: -(kg/ m²
8	**Yeary et al, 2011**	22 African Americans from 3	Rural Arkansas LMD	16-session intervention led by church members that discussed topics	Obesity	-Lost an average of 2.34 kg -Participants liked spiritual focus of the stu

				conditions : 1. Control, 2. Self-Help, and 3. Motivational Interviewing		servings/day -Between Groups 2 and 3, Group 3 increas Fruit and Vegetable consumption by 1.1 servings/day
10	**Christie et al, 2010**	383 African American females from 25 churches	Jacksonville, Florida	24-week intervention with 12 weeks led by a health coordinator and 12 weeks of meetings led by church staff	Obesity	-Change in weight loss: 2.9% -Change in BMI: -4.0%
11	**Kennedy et al, 2005**	40 African Americans from a single church	Baton Rouge, Louisiana	6-month weight loss program separated into either group intervention or individual intervention	Obesity	-No statistical difference between groups -Change in Weight for all programs: -3.3 k -Mean body fat loss: -2.0 kg

PA = Physical Activity
AME = African Methodist Episcopal

6.2.1 Church-Based Interventions on Physical Activity

Wilcox et al (Study 1), Duru et al (Study 2), and Whitt-Glover et al (Study 3) each conducted a faith-based physical activity intervention using a variety of techniques and outcomes. Each included African American participants enrolled in the church(es) of interest, and sample sizes ranged from 71 – 418 individuals. Ages ranged from 18-83 years, and participants were predominantly female. Study 1 employed a community based participatory research (CBPR) approach that was more hands-off than the randomized controlled trial (RCT) approach by Study 2 and single group intervention method by Study 3. The levels of behavior change regarding physical activity in each study varied, from no statistical significance (Study 1) to an increase of almost 70 minutes per week in moderate physical activity (Study 3).

The implementation strategies of the church-based intervention was most similar between Study 2 and Study 3. Both utilized eight weekly group meetings to deliver the physical activity intervention and concluded in relatively similar results. Some strengths involved with these two studies was the selection of participants interested in physical activity improvement and the incorporation of faith into each session. In the participant recruitment phase, both studies advertised information pertaining to the trial and only involved those participants that showed interest. The benefit of this strategy was revealed in relatively small attrition rates, approximately 15% for each. It is important to note that of the faith intervention group of Study 2, only three people did not complete the study as opposed to six in the control group. Though many factors could be used to explain this difference, a possible reason could be a stronger desire to continue and succeed when faith and spirituality are incorporated. Also, the way faith was integrated into each

program adds to the strength of the study. During each session, prayer and scripture readings were used as a support mechanism and to highlight passages of the Gospel that asked followers to maintain a healthy physical body. In Study 3, the researchers had identified a lack of spiritual focus as a limitation in previous studies and tried to better incorporate the church and spiritual messages throughout the program. Participants were satisfied with these additions, stating that other Black Churches would probably benefit from a similar program.

However, a few limitations hindered these two studies from achieving substantial, long-lasting results. Most importantly was the failure to better emphasize full-church support throughout the study, especially from the pastors and other church leaders. Study 2 does not refer to using anyone other than participants as a part of the study. As stated earlier, pastors and church leaders are respected; and having them actively promoting and showing interest in the program could have increased the participants' willingness to improve. Study 3 used pastors during the preparation and implementation of the program; but once the program started, the church seemed to have little role in promotion or support. Also, barriers associated with distrust or unfamiliarity with the researchers could have resulted in a lack of eagerness or to the dropout of a few participants. Lastly, Study 3 chose not to perform a RCT to objectify results (Corbie-Smith, 2002). Though distrust in the healthcare field is prominent, Study 3 could have reached out to the church leaders more to help in making a control group more feasible. Without a control group for comparison, the results are merely an analysis of that particular group of participants and less informative for the effectiveness of faith-based interventions, in general.

Study 1 took a different approach to addressing physical activity within the African American church population in South Carolina. Instead of developing a monitored research program, Wilcox et al implemented a CBPR approach that trained church members to deliver their own program within an existing health ministry. Physical activity results were tabulated through telephone surveys one and two years later. Per advice from various AME church leaders, Wilcox et al implemented an immediate and delayed intervention group, of which the delayed group served as the control. In this style, each church had the opportunity to provide a physical activity program at some point during the two-year study. Individuals from 303 churches were trained on how to organize, advertise, and implement a physical activity program.

The strengths associated with this study were promising to the future of physical activity programs within this area of South Carolina. Though actual implementation of programs was low, they were able to develop a way to give training and various educational and exercise supplies to 303 churches. Such widespread outreach is promising to future studies looking to utilize a similar plan of action. Though primary outcomes of increased activity were not met, heightened awareness of the need for such a program and an intention from 45% of trained churches for sustained physical activity programs were substantial and impressive results that could reflect positive results in the coming years. Second, the lack of significant results might be a better and more accurate depiction of not only the lack of interest in increasing physical activity to address health concerns but also the difficulty in producing substantial results, no matter the setting. Lastly, by allowing the church staff to create their own program, church leaders and the congregation were more likely to become attached and committed to the intervention, for

it is a product of their church. Those churches that had pastor support of the program or active communication about the importance of physical activity recorded better participation.

However, a few weaknesses in the study might have contributed to limited results. Most noticeably was an apparent lack of interest by church members and leaders. Due to the nature of CBPR, the researchers were only to provide the initial means to jumpstart a program. It might have garnered more successful results if Study 1 incorporated a more hands-on approach or increased interest in how churches were faring before the one and two year follow-up surveys. If the primary researchers had done preliminary monitoring of each intervention site's willingness to implement a program or provided encouragement and incentives along the way, results might have been better. Also, CBPR approaches require much more time to become established and produce reliable results. Programs have to settle into a routine, discover personalized ways to increase participation and results, and allow for a complete adjustment in the health behaviors of a congregation.

6.2.2 Church-Based Interventions on Diabetes

Davis-Smith (Study 4), Boltri et al (Study 5), and Dodani and Fields (Study 6) each conducted diabetes intervention programs with a faith-based approach. Each used churches (1-5 churches) in rural Georgia except for Study 6 which was implemented in a larger city of Georgia. The number of participants used in the studies ranged from ten to 35, and ages ranged from 18-66 years. Participants were recruited by interest and were screened for eligibility by age and level of risk for developing diabetes. Studies 5 and 6

utilized a CBPR approach for implementation whereas Study 4 used a modified 6-session lifestyle arm of the Diabetes Prevention Program (DPP), originally developed by the National Institutes of Health (NIH). Each study yielded positive results, varying from a 6.4 mg/dL to a 9.0 mg/dL drop in finger-stick glucose readings (Studies 4 and 5). Study 6 only recorded weight change, recording a drop in at least 5% bodyweight in 88% of the participants.

All three studies had similar methodology. Study 4 and Study 5 utilized a six-session program modified from the original NIH-DPP. Study 5 also employed a 16-session program but received results that were insignificantly different from the 6-session program. Study 6, however, utilized a 12-session program that was created by the principal researcher. Churches were selected by level of interest and participants were chosen through a voluntary screening process. Input for implementation and management of the program was offered by a variety of people, including at least one church member from each participating church. A group-based design was implemented for both studies to ensure a comfortable setting, motivation among church members, and an opportunity for spiritual fellowship. Each session for Study 4 and Study 5, held inside the church, began and ended with a prayer given by one of the church members. Study 6 did not specify whether or not prayer was included in each session. However, the spiritual component of the intervention was delivered in three forms: from the pastor, in the groups, and to the individual. Sessions for Study 5 and Study 6 were run by a member of the church, and sessions for Study 4 were run by an outside healthcare professional. Following the conclusion of the 6-week (and 16-week session for Study 5) session of Study 4 and Study 5, researchers implemented a 6- and 12-month follow-up to

determine any sustained modification in behavior. Study 6 continued a 6-month booster program but was still in progress at the time of publication.

Participation rates for Studies 4, 5, and 6 were 78%, 62.1%, and 86.5%, respectively. By the 12-month follow-up of Study 4 and Study 5, factors that contribute to the onset of diabetes - fasting glucose, weight, and BMI - all decreased. Study 6 also saw substantial improvements in weight at the end of the program. After the Study 4 and Study 5 were complete, church members decided to continue its focus on health by implementing their own health-focused groups. A continuation of health groups was not mentioned in Study 6.

Each study had a number of strengths to their implementation strategies. Though the CBPR technique was used in each study, the researchers from these studies seemed much more focused than Study 1 in gathering positive results by conducting in-person screenings and follow-up tests at the church. Study 6 held a bigger spiritual focus for each session and had consistent pastor attendance that most likely contributed to the higher attendance rate of participants. Also, by choosing churches based on interest was a major factor that led to a more eager staff. Having a staff that was interested and engaged most likely contributed to the high attendance rates, positive results, and a continued desire for health programs. Each study attempted to reduce issues of mistrust by conducting all aspects of the study, from the initial screenings to the sessions, within the church. By making the church the permanent and only setting for the study, participants may have felt more comfortable and more willing to give their time. Lastly, Study 4 and Study 5 worked to cut implementation costs to determine if a low-cost but

successful health program was feasible for churches. Study 6 also referred to low costs as a positive asset to such a program design.

However, a few limitations noticed in these studies must be addressed. Most important is the lack of a RCT design. Without a control group, it is difficult to analyze the objectivity and true success of this program compared to a standard clinical trial. Study 4 and Study 5 both had a small number of participants, and each study ended up with a large majority of women instead of a more balanced population. These two factors might have skewed a true representation of the results, for men might have had differing results. In Study 4, the sessions were conducted by an outside healthcare professional as opposed to an active member of the church. Though it did not reflect in the participation rate or the results, bringing in an outside leader might have impacted results because he was unfamiliar and unconnected with the church. Lastly, the spiritual component of programs in Study 4 and Study 5 seemed to be lacking. Faith-based messages other than an opening and closing prayer were not described. Many passages in the Bible point to health and the importance of maintaining a healthy body; therefore, utilizing them more during each session might prove beneficial (Holt, 2006).

6.2.3 Church-Based Interventions on Obesity and Nutrition

Fitzgibbon et al (Study 7), Yeary et al (Study 8), Resnicow et al (Study 9), Christie et al (Study 10), and Kennedy et al (Study 11) conducted faith-based interventions focused on controlling and preventing obesity in the African American population. Each study implemented a different strategy to use spiritual motivation to affect participation and encourage weight loss. The number of participants ranged from

26-861 participants. Study 7, Study 8, and Study 11 also required participants to have a BMI $\geq$ 25 kg/m^2. Ages of participants ranged from 18-87 years. Study 7 implemented a RCT, comparing a faith-based intervention with an empirically tested and proven, culturally tailored intervention for African Americans. Study 8 employed a CBPR approach, similar in methodology to Studies 4 and 5. Study 9 focused on increasing fruit and vegetable intake rather than weight loss. Study 10 implemented a 24-week program that focused on lifestyle changes to facilitate weight loss. Study 11 used a RCT design that compared group intervention to an individual, control intervention. Studies 7, 8, 10, and 11 concluded with positive results, with average weight loss ranging from 2.34 kg to 3.3 kg. Study 9 did not record weight loss results but showed significant improvement in fruit and vegetable consumption.

Though none of these studies applied similar strategies of implementation, two of the four (Study 10 and Study 11) did not use faith-focused strategies like prayer or scripture reading in their sessions. The "faith-based" aspect of their research was focusing on African American churches for participants, a venue, and volunteers. However, it is interesting to see how a change in location might affect weight loss results. Study 10 used a 24-week intervention that was split into two separate phases: (1) a structured intervention with lectures with physical activity, cooking lessons, and nutrition education led by a professional worker and (2) the same intervention but led by an African American health coordinator. Study 11 used a six-month program with two separate interventions: group and individual. Nutrition education was delivered in both interventions, and the participants in the individual intervention kept food diaries.

A decrease in body weight and BMI was seen in both studies. Study 10 found that obesity measures and physical activity improved over Phase 1 and continued or maintained during Phase 2. Study 11 also reported weight loss; however, the differences between the two interventions were not statistically significant. Both had high retention rates, suggesting that the setting alone might be just as important as actual spiritual engagement for African Americans and their desire to see through with a study. These findings suggest that low-intensity interventions set within a church, as described by Kennedy, can be just as effective as weight loss studies done in clinical settings. Therefore, as church-based interventions become more popular and practical, public health workers may be able to reach more people that are in need over current, traditional intervention methods.

Studies 7, 8, and 9 each focused on churches for participation but also incorporated a spiritual component. Study 7 created a 12-week intervention program that had participants randomly separated into one of two culturally sensitive groups: faith based or non-faith based. The culturally sensitive information included lessons describing better ways to prepare Soul Food, emphasized the importance of family and social support, and gave advice on how to best prepare meals for larger gatherings. To keep both groups equal, the researchers decided to host the sessions in a non-religious atmosphere. The faith-based intervention group received the same schedule as the culturally sensitive/non-faith based group but integrated relevant spiritual topics and scriptures during each session. Study 8 created a modified 16-week intervention from the DPP that used sessions and an applicable Bible study to specifically address health, faith, and ways to overcome barriers to change. Participants also were asked to keep diaries of

daily intake, physical activity, and spiritual reflection. Researchers for Study 9 created a self-help weight loss packet that included a spiritually driven video on the importance of healthy eating for the physical and spiritual self. These packets were administered to participants divided into three separate treatment conditions: Group 1 would receive education materials at the initial meeting and culturally sensitive materials after a one-year delay; Group 2 received a culturally sensitive self-help intervention and a telephone cue call; Group 3 received a culturally sensitive self-help intervention, a telephone cue call, and three telephone counseling calls that exercised motivational interviewing techniques. Researchers hoped that the cue phone call would remind participants to review the packet and the counseling calls would be mainly used for breaking down barriers to change and continual support and guidance for a healthier self.

Weight loss was demonstrated in Studies 7, 8, 10, and 11, and an increase in vegetable and fruit intake was found in Study 9. In Study 7, 17% more people enrolled in the faith-based group lost weight and had a larger decrease in BMI than in the control group, suggesting that a faith component could potentially have a more positive result in weight loss interventions. Physical activity increased significantly in the control group but not in the faith-based group. Study 8 yielded results that were not significant different from the baseline results. However, many reported feelings of increased social support from friends and family. When researchers only looked at participants that attended at least 50% of the intervention classes, there was a 4.51% decrease in average initial weight, resulting in a mean weight loss of 4.04 kg. Study 9 showed a significant increase in fruit and vegetable intake from participants in the motivational interviewing group. A lack of change was seen in both of the other groups. Researchers explain that

the motivational interviewing calls might have served more as another cue call, reminding participants about their self-help packet instead of a direct means to actually establish behavior change.

Each of these studies yielded numerous strengths that need to be recognized. Study 7 conducted their study using faith-based intervention but separated from a church setting. Compared to the previously reviewed studies, this method of delivery is new and interesting but accentuates an important obstacle for future faith-based intervention research. In order to host true RCTs for this type of research, a church setting might actually prove to be challenging because it may disallow a true control setting. If faith-based programs perform equally well or better than control groups when placed outside the church, it is logical to presume that the session would only perform better when placed in a more agreeable and comfortable setting. Study 7 also examined a culturally sensitive approach to weight loss. Instead of pressuring participants to overcome social barriers, like prohibiting cultural foods, the design focused only on improving recipes and preparation techniques to create a still enjoyable but healthier option.

The biggest strength seen in Study 8 was its focus on spiritual guidance. Though significant results were not seen from all of the participants, there was an increased satisfaction in social support from friends and family. In a long-term study, social support might actually work to improve health and encourage behavior changes. Many also reported that the program's focus on the Bible was an encouragement to make changes and choose healthier options. Teachings from the Bible can be used as further support, outside of family and friends. For the African American community, spirituality tends to be a crucial aspect of the self. By revealing Biblical passages that emphasize the

importance of maintaining a healthy lifestyle, one might be able to motivate others toward meaningful change.

As mentioned before, Studies 10 and 11 show that implementing a health program in a church might be sufficient for behavioral change. When coupled with Study 7, the results potentially reveal two separate positives: (1) faith-based interventions show improvements over non-faith based interventions and (2) the church is just as effective, if not a better, setting for health interventions than traditional locations. Also, these two studies shed light that church members with minimal training in group therapy and health could serve just as meaningful a purpose for members of their church as outside, professionally trained health workers. If true, using church members as leaders would significantly reduce overhead costs for intervention programs as well as provide a familiar and trusting face for participants.

Limitations with these studies are similar to those previously discussed. First, without RCTs, it is difficult to determine whether faith-based interventions are equal to or better than traditional methods. Though it does reach a wider audience, more research is needed to see if these interventions are actually creating quality, long-term behavioral changes. Also, recruitment was based solely on one's willingness to participate. Such a non-random method of selection may skew results in attrition rates and lifestyle change, for voluntary participants that seek help are more likely to work hard to create positive results.

6.3 Church-Based Interventions in Mississippi

The purpose of this thesis is to not only determine if faith-based organizations of Mississippi recognize the problems of type-2 diabetes within the African American

population and show interest in working to improve such problems but also emphasize the need of faith-based organizations in Mississippi for any chronic disease prevention. With such a large African American population situated within the Bible-Belt, Mississippi has a unique demographic that is well suited for faith-based studies and chronic disease prevention interventions.

The Ole Miss Library and Pubmed were searched for church-based interventions that have taken place within Mississippi. Initial search terms included "faith based," "church based," "African American," and "Mississippi." Listings were reviewed to ensure that the study was performed within the state of Mississippi. One article that was listed described money given to faith-based organizations for tobacco prevention programs, but nothing in the article stated that research was done on the effectiveness of using a faith-based intervention (Reinert, 2008). The search was broadened with the removal of "African American," but appropriate results were still not found. Though a non-academic and less rigorous approach, Google was searched for any references of faith-based public health movements in Mississippi that were not available in peer-reviewed scientific journals. A number of results were found. The Mississippi State Department of Health website provided information on grants for faith-based intervention research and stated a goal to increase community-level action to fight diabetes (Mississippi State Department of Health, 2012). The Mississippi Faith-Based Health and Wellness Network, a joint group of health professionals and faith-related workers, website was found discussed the importance of faith-based interventions. Goals, including efforts to establish, assess, and fund effective health ministries were listed (Healthy Congregations Mississippi, 2012).

A 2010 USDA report that detailed a current church-based intervention for obesity prevention in the Mississippi Delta was obtained in this search. Six churches were recruited and randomized as either a control or faith-based approach, but only three completed the six-month follow-up. By the publication of the report, 110 participants across three churches have completed the follow-up assessment. The project is expected to conclude in 2014 (USDA, 2010).

Another article was found that details a 2008 Body & Soul program at a church in Swiftown, MS that implemented by the Delta Health Alliance. It states that a pilot program was created with three churches and 50 participants. The program implemented a nutrition intervention that is based on four points: (1) pastoral leadership, (2) educational activities, (3) establishing a healthy church environment, and (4) emphasizing peer counseling. Churches have reported offering a larger quantity of fruits and vegetables in meals served at the church. Future goals include 12-14 churches and over 400 participants (Delta Health Alliance, 2012). A peer-reviewed article on the study, however, was not found.

A similar study was found in the archives of the American Public Health Association. Set in the Mississippi Delta, this study incorporated ten faith-based organizations in a 12-week intervention that focused on creating healthy lifestyles in diabetic individuals. Findings of increased health knowledge and healthier eating were reported, though no statistics were given (Payton, 2011). The article could not be found in a published, peer-reviewed setting.

7. METHODS

This study was designed to determine the extent to which the African American church community has responded to the disproportionate levels of type-2 diabetes within the African American community. For those churches that have yet to implement a health-awareness program that addresses type-2 diabetes prevention, the primary investigator attempted to gauge the interest and willingness to pursue such an action. The research protocol and interview questions were approved by the University of Mississippi Institutional Review Board.

7.1 SELECTION OF CHURCHES

Churches were initially selected by simple searches through the online Yellow Pages website or through Google searches of the terms "Mississippi" and "church." Any church name that included "Missionary Baptist" or "African Methodist Episcopal" was automatically included, and other denominational or non-denominational churches were later included after confirmation that the church congregation was mostly African American, either by website or word of mouth. These churches were located in one of three areas: central Mississippi, northeastern Mississippi, and the Mississippi Delta. From this initial search, 21 churches were identified as potential sites for interviews. Churches were later added from suggestions by interviewed pastors. In total, 26 churches were selected for interviews.

7.2 Participant Eligibility

Pastors were contacted by phone or email and were determined to be appropriate to participate in the study if they met the following eligibility criteria:

a) Was the current pastor of the church;

b) Had been a member of the current church for at least three years;

At least three years of service within the church was considered to be a sufficient length of time for pastors to provide accurate and informative detail on their congregation as well as the health status of their church.

7.3 Data Collection

Those pastors who met eligibility criteria and consented to participate were interviewed either in person or over the phone. Each interview was audio-recorded and transcribed by the primary investigator. For in-person interviews, consent forms were given prior to the start of the recording. For phone interviews, the consent form was read aloud and was verbally acknowledged by the pastor. On average, there were two days between arranging the interview and actually conducting it via telephone or in person.

During the interview, the pastor answered questions posed by the primary investigator from a scripted Interview Guide designed to facilitate discussion on type-2 diabetes and the African American church community (see Appendix A for Interview Guide). The interview questions were asked to prompt discussion about a broad range of topics, including food service in the church, health status of the congregation, and the pastor's opinions towards the church's stance on physical health.

Screening forms and interview guides for food staffs and kitchen ministries were also developed but were not used due to difficulties in reaching churches and inabilities of some churches to reach a specific food staff member for interview.

7.4 Data Analysis

All in-person interviews were recorded using a telephone with recording capabilities, and all phone interviews were recorded using a speakerphone and laptop computer. Interviews were transcribed by the primary investigator and relevant quotes were selected for inclusion in the document. Additional comments, opinions, and suggestions not pertaining to questions in the scripted interview guide were incorporated as "Additional Comments" in the results section.

8. RESULTS

All 26 churches were contacted but some were unable to participate in the interview for various reasons. Pastors could not be reached at twelve of the churches. Four of the churches, three of which were located in the Delta, had incorrectly listed phone numbers or the phone lines were disconnected. Two pastors were too busy to schedule an interview during the time frame of the study. Eight churches completed the interview: three from central Mississippi, four from northeast Mississippi, and one from the Mississippi Delta. Two of the pastors were interviewed in person, and the rest were interviewed by phone. Interviews ranged from 11 minutes to 43 minutes and averaged about 22 minutes in length. The length of time pastors were associated with their respective churches stretched from three years to 29 years, with the eight interviewed pastors averaging a span of nine years. Church sizes varied, from 20 members to 1000 members (averaged at 303 members) as well as the percentage of member participation in church functions other than the Sunday worship service, from 25% to 75% (averaging around 48%).

To best describe the overall responses of the interviewed pastors, a question will be listed followed by quoted answers from interviewed pastors. It is important to note that Church 1 and Church 7 involve the same church but two different pastors. To protect the privacy of each pastor, no identifying information is listed in this document.

8.1 FOOD SERVICE WITHIN THE CHURCH

1. Does your church serve meals to your congregation on a regular basis? If yes, how often? If yes, describe one of these events to me.

Church 1:

"After Bible class at 7:30pm each Wednesday night, we feed both the children and the adults who attended Bible class. Our focus has become to have healthy foods, so we use more healthy stuff. We do provide snacks occasionally. But for the most part, through our Christian education effort is to make sure we are serving healthier foods on that night."

Church 2:

"We'll go fellowship at a sister's home. She cooks supper: vegetables, baked food. They try to get us to eat a little healthier. It is like family. It's almost every Sunday except the first Sunday of each month."

Church 3:

"Not on a regular basis."

Church 4:

"Yes, there are a number of occasions serves food and there are a number of times when the church serves food off-site….In the Brotherhood Bible Class, we meet once a month at various restaurants for our men's meeting."

Church 5:

"No. We did a Wednesday night meal but discontinued that two years ago. We stopped it because we found people would come take meals for

themselves and their family and not stay for the Bible study….We do have a meal every second Sunday and a meal every fourth Sunday for our women."

Church 6:

"Not really."

Church 7:

"Yes, Wednesday night meals were designed to be a "Healthy Meal." We were trying to show them some healthier eating tips and hoping that it would get back into them a regular diet routine. We did it consistently over the last 12 years. We were trying to instill in the children healthy meals and hoping that families would prepare more healthy meals at home."

Church 8:

"Yes, once a month."

2. Does your church serve meals on special occasions (Thanksgiving, Christmas, First Sunday, etc.)? If yes, how often? If yes, describe one of these events to me.

Church 1:

"Sometimes at funerals; for high school and college students that are graduating or coming in; we also have an annual picnic at the church."

Church 2:

No answer

Church 3:

"Sometimes we will have a meal on a special occasion like a church anniversary, pastor and wife appreciation program, or a guest speaker."

Church 4:

"There are current events that we'll serve food. For instance, this past Sunday we held a Go Red Sunday meal. For events like that there may be a meal provided."

Church 5:

"We will hold a Soul Food Taste for Black History Month and a meal for our church anniversary."

Church 6:

"Yes, we'll hold a meal once a year to celebrate our feast day."

Church 7:

No answer

Church 8:

"We'll host a church picnic each year."

3. How long has your church served meals to its congregation? Has the frequency changed?

Church 1:

"The frequency has stayed the same."

Church 2:

No answer

Church 3:

"We've always had meals for these occasions."

Church 4:

"Yes."

Church 5:

"We've served food for 12 years."

Church 6:

No answer

Church 7:

No answer

Church 8:

"We moved in 2004 and didn't have a facility big enough to host something like that. Since 2010, we've been serving 100% healthy food."

4. Who provides and prepares this food?

Church 1:

"We do have an industrial kitchen and make sure that someone in the kitchen ministry is certified by the state by going to class to get a certification. That's a plus for us. We are definitely a church that looks to serve the whole man. The standards are just as high as a restaurant."

Church 2:

"A church sister's home. She usually prepares all of the food."

Church 3:

"Sometimes food is catered, sometimes members of the congregation bring the food."

Church 4:

"When food is provided through the church, there is a group called the kitchen ministry, mainly made up of older women, that will serve the food."

Church 5:

"The women's lunch is potluck. The other meals are provided by a person who comes in and cooks the food."

Church 6:

"The parishioners provide the food. Everybody brings a dish."

Church 7:

"We have a culinary group of people made up of volunteers. A director would prepare the menus for the month."

Church 8:

"We have a kitchen ministry that will coordinate who brings what to church, and they'll cook it themselves."

5. Where are these meals served?

Church 1:

"The meals are served in the fellowship hall."

Church 2:

"Outside the church at a sister's home."

Church 3:

"Most are served at fellowship hall."

Church 4:

"There is a fellowship hall where the food is made and served."

Church 5:

"Yes, they are served at the church."

Church 6:

"It is held at the church, outside."

Church 7:

"The meals are served in the fellowship hall."

Church 8:

"In the fellowship hall."

6. If you had to make your best guess, what percentage of the congregation attends these food events on average?

Church 1:

"30% -- a little over 100 people."

Church 2:

"95% -- all but three or four.

Church 3:

"100-200 people."

Church 4:

"80-100 members"

Church 5:

"20% of the entire congregation because each meal is for specific groups."

Church 6:

"95-100%."

Church 7:

"30%. People from the community would also come."

Church 8:

"75-80%."

7. Please list some of the foods that are regularly served?

Church 1:

"Taco type foods with low-fat cheese because we've always been health conscious through our Christian Education. We do provide salads with lean chicken or turkey breast. Recently, we have started providing low-sugar or sugar-free snacks for children. It's been an experiment because we weren't sure if the children were going to like it. We don't have a lot of fatty foods. Occasionally, we do serve a full course with corn and green beans and maybe meat and bread. We usually stay around chicken, turkey, and rarely hamburger meat. Hamburger meat is usually for taco salad. For the most part, we have had chicken and turkey sandwiches. Sometimes, they'll do spaghetti. Very rarely do we do hotdogs or hamburgers. Generally, the vegetables are from a can but the staff usually drains the liquid from the can before they cook it."

Church 2:

"I don't really know how she prepares it. I just know that it's good! It's usually home-cooked foods."

Church 3:

"Regular meat, vegetables, and bread. Then desserts like cakes and pies and stuff like that. Home cooked meal. When a speaker comes, we'll usually do some type of salad, not meat and bread."

Church 4:

"In general, there will be a variety of meat, vegetables, breads, and desserts. Of those, you'll see fried and baked chicken, green beans, lima beans, okra, greens -- collard or turnip. There is usually a starch like macaroni and cheese, sweet potato casserole, and cornbread dressing. As for dessert, we'll have banana pudding or slices of cake. From my knowledge, the vegetables are usually cooked with smoked turkey."

Church 5:

"For the men's breakfast, food is served by a person. It is normally eggs, grits, bacon, sausage, and a fruit cup. For the potluck, we usually have casseroles. Some will bring salads, always desserts. Normally, we'll have grilled, fried, or baked chicken for the women's potluck."

Church 6:

"It's usually salads like pasta and green. Meats include fried chicken, baked ham and chicken. We'll have sweet and non-sweet tea for beverages. For desserts, we'll have cakes, pies, or banana pudding."

Church 7:

"We were trying to get African American families away from the traditional foods that we have been known to consume, like chitterlings, that are high in cholesterol."

Church 8:

"We'll have a meat, which is usually baked or grilled chicken or turkey. Sometimes, we'll have very lean white meat or pork shoulder. We'll have two vegetables like greens prepared with smoked turkey neck, corn, or green beans.

We'll have a salad and wheat rolls. To drink we'll have water and Crystal Light to drink. We have desserts like plain cake and other desserts made with Splenda. We'll also serve fruit with low-fat cool whip."

8. Has anyone in your congregation requested a change in which foods are served due to health complications? If yes, what was the reason? How did you and/or the food staff respond?

Church 1:

"There are people who will come and see what is being served and then decide whether it is good for them to eat. But we've never had a case where someone complained. We try to educate our people so they are very conscious of what they're doing and eating."

Church 2:

"There have been some that have said something because many of us have diabetes. We have to take care of our temple."

Church 3:

"No."

Church 4:

"No because a number of our members actually have diabetes, so I think that our food, though it is flavorful, is prepared with a decreased level of salt."

Church 5:

Yeah, we have snacks for Children's church like potato chips, and we have had parents ask that we serve healthier snacks for the children…. They've asked

us to serve carrots or something like that, but the kids won't eat it. They want children food."

Church 6:

"No."

Church 7:

"It was actually the opposite! I was constantly seeing the need. Having diabetes or high blood pressure or something along those lines were constantly coming up. And I decided that we need to be a model for our people and start looking at alternatives to trying to educate them and assist them. Whenever you announce something new, it has to grow on them. When I first started the Healthy Foods plan, they all said that no body was going to eat it. After the first couple weeks, we had people asking, 'Where are the hamburgers and the hotdogs?' But then people slowly started eating it. It was healthy, good and tasty."

Church 8:

"In the past, people just didn't eat with us. But now, if we have foods that are not diabetic safe, we'll inform them ahead of time. We know who is diabetic and we watch them."

8.2 Community and Church Health

1. Do you believe that people in your community look to the church for support, help, and guidance? Why or why not?

Church 1:

"Yes, definitely. I think it's because there is so much mixed information through the media. I think the church is the last place they feel they can trust. I

don't think that the information out there is misguiding or misleading. Certain studies are driven to meet certain goals, and once those goals are met, there might not be a follow-up to see what happens in the post-study. The feel like if it comes from the church and was wrong, they don't see it as the church misguiding them."

Church 2:

"I feel that some come for economical help because we are a place they can rely on. Anyone can come into the walls of the church and say they love Jesus, but it's what we do outside of the walls that really show if we really love Jesus. Sometimes people need to fix the situation that they're in before they can even think about coming to Christ. Historically, African Americans have had the mentality that the church is supposed to and is obligated to help. If we really love God, we have to help our fellow man before we can even think about being pleasing in His sight."

Church 3:

"Yes. Because our church is set up to reach beyond spiritual guidance. We want to affect family life and job situations to allow them to function in the community better."

Church 4:

"Absolutely. Historically, black congregations have played a critical role in not only spiritual health as well as physical, economic, political, etc. In fact, this church is located in a historically black area of town that was a part of the segregated Jim Crow Mississippi, so the church was the only place people could

receive the kind of attention that was needed. There continues to be a strong sense of the church's role and responsibility in civic engagement…. Particularly in Mississippi because of racial dynamics, people still look toward their church for guidance and leadership in a variety of ways."

Church 5:

"They do, and it's a long-standing practice. In the black community, the church is the one gathering place personifying the courage to engage in activities such a politics, health, and wholeness. They realize the impact the church plays in African American lives. Black churches have been the only institution that African Americans have had. They didn't have country clubs or rotary and didn't have other clubs that could enforce certain things. So they would turn to the church for leadership, inspiration, and guidance. It was a place to feel empowered to live out their lives in the community."

Church 6:

"Yes. The parishioners have always looked to the church for guidance, spiritual and cultural."

Church 7:

"The African American church has always been the lighthouse when it comes to other issues in the community that you could look to for answers, whether it's civil rights, voting, or health. The church has always been more than just a spiritual entity for African Americans throughout history."

Church 8:

"Yes, we have gotten away from that in past years, but we are working as leaders and creating a place for safety in the community."

2. Do you see chronic disease as a problem in your community? Why or why not?
Church 1:

"Yes, I do. It's as large as a national crisis, an epidemic. There are greater preventative measures if we can deal with it from a nutritional standpoint. You have a lot of senior citizens on medication that hurts them in the long run."

Church 2:

"Yes, it is. It's running rampant now. Just about my entire family alone has been diagnosed with diabetes."

Church 3:

"It is. I believe it is because of poor eating habits."

Church 4:

No answer

Church 5:

"Yes, it's a big problem."

Church 6:

"Yes."

Church 7:

"Yes, it's a great threat to our community. And it shortens many people's lives. There is a historical trend among African Americans to not go to the doctor, particularly African American men. I used to stand at the pulpit all the time to try to encourage them to get screenings and tests. I don't know why this started, whether they can't afford it or are afraid. And those are the kinds of

things that have shortened the lives of so many people because they have not looked after their health like they should."

Church 8:

"Yes. When I started at my church, I was at a funeral almost every weekend, and it was because of bad diets. People were diabetic, had high blood pressure, and were overweight. It was strange to meet someone who wasn't diabetic. It shouldn't be the norm to be 18 and on insulin. The obvious issue as to why it is a problem is self-esteem. Some ladies, in particular, don't feel good about themselves. Food is a comfort to them, and it leads to obesity. Another thing is that people are still stuck up on the cultural diet that they've had. I tried to ask people to eat better, but they would reply that their grandparents would eat all of these foods and it didn't bother them. For a while I didn't have answer until I realized that yes, this is true. But they grew all their own food, and to top it off, they worked it off. Now you don't grow any of it and when you finish eating, you lay around. And then there was no excuse because I was telling them the truth. Even people who have hereditary diabetes, they are so hooked up on fat, sugar, and salt even though they know they shouldn't be having it. Another aspect of it is that people just don't take the time to eat healthy and will take the short way out – fast food. Finally, people just can't cook. If you put food on people's table for them to prepare, you'll be spinning your wheels because they just can't cook."

3. Has your church implemented any sermons, church functions, or information sessions on health-related topics. If yes, please describe one of these events.

Church 1:

"Yes, health seminars. I think it's been two years since we've had an actual physician come in. But I had him come in and talk to the congregation on a Wednesday night. We want it to be more frequently, but we are going through some church changes. However, sometimes the response to these programs has not been as great. Maybe we aren't presenting our case as loud as we can. As for sermons, I will occasionally bring up facts that I've read in health journals or health magazines. I also have a lady in the congregation who is a personal trainer that's going to be doing a health tip of the month. We're not where we need to be, but we are better off than those churches that don't have any resources…. The only thing I find troubling now is that we seem too busy to take time to address what is important. The only time we give attention to it is when we are finding out about it or someone is our family was deeply affected by it. That's what we've got to try to work on – to try to cooperatively to get people to take seriousness with their diet."

Church 2:

"Much to my shame, I have to say no. However, we are actually trying to get to the point where we can do more exercising, but that's up in the air right now…. But we have addressed those issues. We have encouraged people to watch their health and eat right and not just eat just any kind of way. We also encourage them to exercise."

Church 3:

"We've never held one but we might consider doing something like that."

Church 4:

"Annually, there is a health fair that we host independently or in collaboration with other churches in the area. These fairs have screenings for blood glucose, cholesterol, blood pressure, and insulin levels. They also provide various materials from nurses on how to measure your BMI. Periodically, there are also other gatherings throughout the year targeting seniors since our church is predominantly 65 and older. It shows them how to maintain a healthy lifestyle. Lastly, the health ministry, in connection with the food ministry, makes sure that the foods we prepare honors those that suffer from diabetes or heart issues."

Church 5:

"Two years ago, we had what we called was the Biggest Losers and we engaged persons to participate in four things: 1. They would pray for each other 2. They would get on a particular diet 3. They would participate in some physical activity 4. They would come to a group meeting for support. The woman who lost the most weight was 28 pounds. It became a widely known thing. Then we competed with a church down the street. Now, the surrounding city is doing the same thing where they'll get all of the nearby churches to participate (20 churches). We would schedule physical activities throughout the program like a walk-a-thon. We have a healthy and welfare ministry here and once a year, and we'll host health awareness where they come out and check blood pressure. Once a year, we'll have a health fair where they will check cholesterol, A1c, and stuff like that. Every quarter, we do some kind of screening."

Church 6:

"Yes, we have had an annual health fair. It is usually all day on a Saturday. We provide information, free screenings, and they provide advice for health."

Church 7:

"One of the things that I wish we had done was host a health fair every year. We bring in doctors, nurses, and health officials. We do all of these screenings like blood screenings and prostate screenings. The church takes up any charges, and we have detected people with diabetes and cancer. It is one of the greatest things in ministry that has helped the community and the church. It allowed people to get tests that they normally wouldn't have gotten – maybe they couldn't afford it. People are more willing to come since it's held in the church. They are comfortable to come to a church." [Referencing new church health focus]

Church 8:

"Getting people to change their diets through the fellowship meals. The argument that the church shouldn't waste their time was because we only had them every now and then for meals. At my church, people actually tried the healthy food and liked it; some even wanted the recipes. How I learned it is that a few years ago, churches used to have wine for communion. But then they got away from it because there were people who were alcoholics and that little bit of wine was enough to knock them off the bandwagon. So they got rid of it because they didn't want to be a hindrance to people. Well, it's the same principle: in the church, people are food-a-holics and the church had to be a place for them to

come eat. What really crushed me was the idea that someone who was doing well diet-wise and they come to a church help breakfast, the place they ought to be able to find help, and all you serve is greasy bacon. Now their taste is back. And before you know it, they are on the way to the store to get more of this no-good stuff for them. The other thing is that we are walking. Every Sunday, we have a blurb about health. People read it and many times, it is something that they are suffering from. It's worked out really well in getting people more engaged about their health. Our health ministry team each month will get up and verbally discuss health topics in the church. Since health is a part of who I am, it's going to come out and get me talking about health eating."

4. Have church members ever asked for the church to give a sermon or information session on health?

Church 1:

No answer

Church 2:

"The Lord has actually put in some people's hearts to tell us that we need to take care of our bodies. Other than that, there hasn't been a lot of requests from the community."

Church 3:

"Yes, we have had people ask for help for various reasons."

Church 4:

No answer

Church 5:

No answer

Church 6:

"No; I'm not really interested in doing sermons on health."

Church 7:

No answer

Church 8:

No answer

5. Do you know people in your congregation whom are diabetic or have a history of diabetes in the family? How common do you believe diabetes among members of your congregation?

Church 1:

"It's a consistent concern. We have mothers and young people that have it here."

Church 2:

No answer

Church 3:

"A small percentage."

Church 4:

No answer

Church 5:

No answer

Church 6:

"Yes, including myself. It is not that common in the congregation. It is about four members."

Church 7:

No answer

Church 8:

"Well, I would have to say 20-30%. It's family group has someone in their group with it. But I've seen an improvement after these health changes. I can look at members and see less of them and know its working. Also, the number of premature deaths has gone way down. Now, I'm visiting hospitals for a member of their extended family that doesn't attend the church. People tell me that they have more energy or they feel better."

6. Will you please explain the following Bible verse to me? It is from 1 Cor. 6:19-20:

"Do you not know that your body is a temple of the Holy Spirit, who is in you, whom you have received from God? You are not your own; you were bought at a price. Therefore honor God with your body."

Do you think Paul could be referring to the importance of maintaining a healthy lifestyle throughout one's journey with Christ?

Church 1:

"I think he was talking about the whole person. He was actually talking about the physical body, being careful what you put in your body. You can't run for God if you're weighed down with stuff that's going to keep you low in energy or if your mind is not nourished to think rationally."

Church 2:

"It can be included in taking care of ourselves in our health. If we are fatigued and worn out, how can we do what God wants us to?"

Church 3:

"I definitely do believe that he is talking to us about maintaining a healthy body and not to abuse our bodies by overeating. Obesity is a real problem here."

Church 4:

"Yeah, and most of us have read it that way. There is a sense that the body is a temple. But we also talk about gluttony and abusing our bodies in ways. We spend so much of our time hitting on things in sex and drugs and those kinds of abuses and not thinking about the ways we have abused our bodies in terms of the foods we eat, and how much we eat, and how many times we eat. So with gluttony, many churches have not done the best job at addressing that."

Church 5:

"It is because if it is a temple, we should be accountable. We as individuals are held accountable by God to maintain our temple in a healthy, wholesome fashion. Now, obesity is a voluntary thing…it is out of gluttony, which is a danger to the temple, and out of greed, which is a danger to the temple. Anything we do in excess is against the principles of good health."

Church 6:

"Yeah, he's talking about a healthy lifestyle. During that time, they were talking about the coming of Christ. People were partying, and he was talking to people about taking care of their bodies and not doing things excessively."

Church 7:

"I think it can. That's not what Paul is talking about, but it can be used to talk about nutritional health, not to put any strange and obscene things in the body."

Church 8:

"No, that's a stretch. I had to be real careful with Scripture and taking it out of context. People have used it all the time in the way in which you've done, but I'm a firm believer in good hermeneutics. In the context of the whole thing, Paul was dealing with sexual immorality. To say that you're using it for that would cause issue with some pastors and it is a turn off."

7. Can you think of any other parts of the Bible in which faith and physical health are linked?

Church 1:

No answer

Church 2:

"God has said that he wants us to be in good health."

Church 3:

"Ecclesiastes: there is a time for everything. There is a time to eat and a time not to eat, certainly."

Church 4:

No answer

Church 5:

No answer

Church 6:

No answer

Church 7:

No answer

Church 8:

"Jesus and the feeding of 5000. Jesus was concerned about the people because they hadn't eaten anything and were going to get sick. Paul has Luke, a doctor, with him at all times. If you look carefully at Jesus's ministry, they all focus on the concept of 'Shalom,' the Hebrew word that we call Peace. We misinterpret peace as just the absence of conflict. But in the Hebrew culture, 'Shalom' meant mind, body, and soul. In the King James Version of the Bible, you'll see many cases where Jesus says that you have been made whole. What he means is that now you are not only healed physically, but mentally and spiritually as well. Health is more of a nuance in the Bible but is a major part of Jesus's ministry and the New Testament teachings.

8. How receptive do you think members of your congregation would be to hearing sermons about physical health and preventive care? To participating in church functions focused on physical health and preventative care? To host a sermon and information session about the connection of physical health to spirituality and then allow only healthy foods to be served at church-promoted functions?

Church 1:

"I definitely agree with that, and that's why I try to touch on it in my sermons."

Church 2:

"I think it will probably 100%. I feel like they are just waiting on me to say something about it."

Church 3:

"I think they would be encouraged by hearing it."

Church 4:

"Yeah, they were very helpful and were glad that the church was doing it."

Church 5:

No answer

Church 6:

"Yes, they enjoyed the screenings."

Church 7:

"Yes."

Church 8:

"Yes, they are because I didn't rush it to get it done. I had to work with the members, lay things out little by little until I had a full health ministry. The biggest issue I had was with fried chicken because a lot of people like fried chicken. However, I had one thing going for them. I knew that people would prefer home-cooked food as opposed to food at a store. Most people now are too lazy to cook fried chicken – they actually buy it. So given the choice between store-bought fried chicken or home cooked grilled or baked chicken, the home-cooked chicken will win out."

9. Do you think the church should have any opinion in how people treat their bodies? Why or why not?

Church 1:

"Why not just do what God asks you without having a whole medical journal. You can't help but to care because these are the people you love."

Church 2:

"I feel like they should because each church knows their congregation. They should be involved in it all."

Church 3:

"I believe that we should get our information of how we treat our bodies from the Scripture, and I don't believe we are doing that right, according to the Scriptures."

Church 4:

No answer

Church 5:

"One of the biggest problems we have is an unhealthy clergy and a lot of our preachers are obese. We have not done a good job at helping people become aware. In Mississippi, a lot of obesity is due to poverty we are going to buy the cheapest and fried foods. I think the church can lead the way to help reverse that trend and help all of us eat more healthy and be more active. Years ago we had to walk places, now we ride places. We need to get our people more mobile. We need that push up and push back. Push up the exercise and push back from the table."

Church 6:

"Mainly, the church is a place to help people. My church also has many nurses."

Church 7:

"Yes because we are, as a church, responsible for not only the soul but for the body and the spirit. So yes, we should have some say what we put in and consume…. The church should always try to prevent people from abusing certain things that are not good for their health. Back in the day, we had to eat what we did because, economically, we had to eat it. You either ate this or you didn't eat. I think the Lord was gracious during that period because when I was a kid, I ate strap-back out of the crib with salt all on it but never developed high blood pressure. But as we advanced, all of those things started affecting us. We had to make an adjustment because we were not working as much or exercising as much. We kept eating this stuff and now we're sitting behind a desk and still eating all of this stuff."

Church 8:

"Oh yes, definitely. Some preachers say, 'Do as I as say, not do as I do.' Others don't want help at all because they are unhealthy and don't want to be exposed. Anything that God created is good. So what we have is really God's. So everything of God's we should take good care of. The church is the bride of Christ, so individuals have to be good stewards of their bodies. If we don't do the right thing with our bodies, it's like saying we don't love God. Our bodies are

built in His own image. If we do bad things to our bodies, we are actually disrespecting God."

10. Additional Comments

Church 1:

"It's hard to get rid of habits and foods we love, and I think that's what makes it so hard for diabetics. Doctors tell you what you can't do, and they don't have the time to tell you what you can do because he has to see other patients; because I was brought up with some of these foods, I often do not have tolerance. But I'm getting more health-conscious. We're here to care for these [sick] people. Nutrition is the gateway to curing these things; it all starts with diet. I feel like if I'm going to teach and preach, I need to be as healthy as I can or I won't be able to do it."

Church 2:

"Normally as African Americans, we don't think on behalf of our health because we trust God. But God expects us to do what we can do."

Church 3:

"In the day we are living in, especially in America where we have a lot of eating disorders and diseases that are especially common in African Americans, I believe that if people begin to respect and turn back to the instructions of the Scriptures and begin to practice that, I believe that it would begin to change their health tremendously. We live in a society with so many fast-food places and most of the foods we just need to admit that are not a part of a healthy diet."

Church 4:

"For the past 12 years, I have talked about a holistic ministry, ensuring that we are spiritually, morally, ethically, and physically fit and looking at the Gospel for not only our soul salvation but our for our whole body. There is a passage "I hope, I wish above all things that you be healthy and prosper, even as your soul prospers." For me, there's a sense that all that we are is touched by the Gospel, and we have to be good stewards of these temples that God has given us. In a number of our churches here in Mississippi, especially in rural areas, food and fellowship are so central to our life together, and I don't think that should be cut out. But we should look at innovative ways to ensure that we are being good stewards to our bodies and that we are not committing spiritual malpractice in the ways that we dine together. Food and table fellowship are very central. In the future, I hope we can preserve the flavor of our good southern cuisine while at the same time cutting back on the things that kill us slowly and sooner.

Church 5:

"I think the health fair was a very good support mechanism because the church was leading the way, with body, soul, mind, and spirit. So it's a holistic approach."

Church 6:

No comment

Church 7:

No comment

Church 8:

"Some of the questions I'm asking to pastors are the questions that they hate to answer because pastors are people of faith. They don't need a researcher to tell me. I trust in God and don't need to document it."

9. Discussion

The goal of this study was to determine, qualitatively, the extent to which African American churches have responded to the high prevalence of type-2 diabetes among African Americans living in Mississippi. Through interviews from pastors in various regions of the state, I was able to gauge current food service in the church, observations of health in the church and in the community, and willingness of churches to adapt and address these health concerns. In the following sections, I will (1) analyze my findings; (2) discuss areas of strengths and limitations of this study; and (3) conclude with suggestions for future research.

9.1 Discussion of Findings

9.1.1 Discussion of food service in the African American Church

The goal of this section of the interview was to determine the level of attention churches were giving to the types of foods being served to the congregation. Of the churches interviewed, five served meals on a regular basis. The other three would serve a meal a few times each year for special occasions. Some of the common foods reported by pastors that did not mention nutrition as a focus in their health ministry were “fried and baked chicken,” “collard greens,” “macaroni and cheese,” “casseroles,” “sweet and

unsweet tea," "cakes," and "banana pudding." These pastors (Church 2-6) described their meals as "home-cooked" meals or listed foods commonly found in a traditional Southern menu (Bovell-Benjamin, 2009; Tucker, 2005). Pastors from churches 1,7, and 8 seemed to understand and appreciate the impact that the church meal can have on eating habits. Church 1 mentioned salads and using low-fat or low-sugar ingredients in their preparation and often referred back to their certified kitchen staff and their emphasis on health in Christian education. Church 7 pinpointed that his mission was to "get African American families away from the traditional foods we have been known to consume," and the pastor from Church 8 echoed this sentiment later in the interview. Church 8 also emphasized serving wheat rolls, food cooked in leaner turkey neck stock, fruits, and desserts with Splenda. He only listed water and Crystal Light as the provided beverage, suggesting that sweet tea was not provided at the church events.

Pastors from churches 4,5 and 6 each indicated that their food service generally consists of unhealthy foods, yet they do take proactive approaches to congregation health by hosting health fairs. Some pastors stated that it was difficult to remove home-cooked foods, like fried chicken, from the church menu because of its popularity among the congregation, and such cultural demand might be a reason for the lack of nutritional changes in these churches.

Only two of the interviewed churches, Church 2 and 5, mentioned that someone in the congregation requested some type of food or lifestyle change for the good of the congregation. Three pastors that switched to a more healthy food menu initially experienced some backlash from some members of the church not wanting to accept the changes, but members slowly began to realize that the healthier options tasted just as

good and ceased complaining. This reveals the sense of connection between Southern cuisine and African Americans. "Food and fellowship is central" to the African American culture and it is often "hard to get rid of the habits and foods we love," according to the pastor at Church 1. Since many in the congregation were already diagnosed as diabetic, one can assume that these people did know what is and what is not healthy but just chose comfort food over healthier alternatives.

Also, two pastors had similar complaints that if their grandparents ate this unhealthy food and are still alive, it should not be that bad; and both gave similar references to the changing of the times. They provided a good point that food used to be labored for, was mostly home grown, and was less available, economically, to many African Americans. Now, that people live more sedentary lives, the calories and nutritional risks are rapidly increasing even if the intake is the same.

9.1.2 Discussion of Community Health and the Church's Potential Role in Preventative Medicine

The second half of the interview was designed to gauge observations of health in the church as well as investigate the church's potential in becoming a role model for preventative health. Each of the eight churches recognized diabetes and other chronic diseases as being major problems in their congregation and the surrounding community, calling it an "epidemic" or a "great threat" to the African American community. These opinions reflect first-hand accounts of what health statistics have revealed about the Mississippi population – a large and disproportionate percentage of African Americans are suffering from chronic diseases like type-2 diabetes in Mississippi.

This section of the interview also paralleled the importance of the African American church that was discussed earlier. The church is usually a place for spiritual guidance and advice, but the African American church plays a pivotal role economically and politically in the lives of many African Americans. As one pastor put it, the African American church has been a "lighthouse" for the community when it comes to support, guidance, and trust. Church 5 explained that in the beginning, the church supported the African American community during difficult times when they had no other body to call their own. The pastor of Church 4 said that his church continues to be a strong leader for civic engagement, even after segregation and the Civil Rights movement. The sense of community in the church is built on its willingness to "go outside the walls" of the church and "affect family life" to allow the surrounding population to function better. Through this work, the church has been a place that its followers can trust and feel comfortable.

Furthermore, the pastors agreed that to support and provide for its congregation, the church should have a stance on nutrition and health and should serve as a role model to influence healthy practices, and even claim that it is the church's main responsibility to nurture the congregation's "mind, body, and soul." Many of the pastors believe that health advice should be given through the Scripture. According to Church 8, the Bible provides nuances of healthy advice throughout and is a "major part of Jesus's ministry." To the pastors of Churches 1 and 3, the Scripture is its own medical journal that provides ample information of how to best treat one's body.

Lines of a commonly quoted passage in the Bible from First Corinthians were asked to spark a small discussion and reflection on the presence of health and nutritional teachings in the Bible. All but one pastor thought that this specific passage could be used

to explain God's emphasis on protecting and taking care of one's given body. The dissenting pastor, however, mentioned other areas of the Bible that referenced opinions similar to the other pastors, stating that mankind was originally made in God's image, and people dishonor Him by destroying their bodies. Only three pastors could cite other passages of the Bible that emphasized the importance of health. It is very possible, though, that pastors were caught off guard by the question and were unprepared to think of passages on the spot or were afraid of misquoting lines of the Bible. Therefore, I do not interpret the general lack of answers to this question to mean that the Bible is void of healthy references or indications that the pastors are indifferent to the topic of health and the Bible. However, referencing the Scripture might prove to be an effective strategy to reach out to an audience unwilling or unaware of the need to change nutritional behavior. The idea behind faith-based intervention is not just that the study takes place within a church or among a group of people that attend the same church. The potential power that gives credence to faith-based studies, especially in the African American community and those studies using CBPR principles, is the intense connection between spirituality and wellness that is taught throughout the Bible.

One setback to this emphasis on the church's leadership in health education is the unhealthiness of the pastors. The pastor of Church 5 pinpointed this problem, stating that the biggest problem with the church's efforts to battle health complications is a generally unhealthy clergy. In fact, two pastors admitted to having diabetes, and one of those had already had his first stroke before the age of 45. It makes sense that for an institution like the church that is so instrumental in the lives of many African Americans, the pastor would also be viewed with similar importance and credibility. Therefore, these pastors

are role models for what they say and what they do. The pastor of Church 8 explained that many pastors preach from a "Do as I say, not as I do" mentality and are hesitant to emphasize health just because they struggle with it, too. The pastor of Church 1 even admitted that he often struggles with making healthy food choices when he would rather eat the traditional and unhealthy comfort foods. In order for a ministry to really affect the nutritional lives of its congregation, everyone, including the pastor, must be on board and show a willingness to change.

Lastly, I previously mentioned the difficulties many churches have faced in switching to a more nutritious menu. By appeasing the congregation's immediate desires and not looking after their nutritional wellbeing, the church is only continuing the problem, perhaps unconsciously. For instance, the frequency of meals and the types of meals served at the church may be important indicators of health in a church, for it establishes a level of comfort and familiarity with foods that are served. If a congregation member received fried chicken every Wednesday night at church Bible study, he would not only begin to associate fried chicken with the church but would also lose any guilt from eating such an unhealthy option because the church was "allowing" it. Since the African American church has such crucial influence in African American guidance and support, the choices that these churches make in which foods are served can be monumental in improving the diets of many African Americans.

There is, however, a sign of hope. When asked whether or not the church congregation would be receptive to hearing more about health in the Bible and moving the church toward a healthier environment, they all agreed with this statement. One pastor felt like his church was just waiting on him to instigate change and would follow

once he made the move. Others were also confident that the church would accept the changes once they understood that it was the duty and responsibility of the church to look after the physical as well as the spiritual health of its congregation.

9.2 Strengths and Limitations

The research reported in this thesis was to qualitatively determine how the African American church has responded to problems of type-2 diabetes in the community as well as to learn if the church could potentially serve as a better venue for future preventative health studies. These interviews could provide substantial evidence to the potential benefit of utilizing faith-based organizations for preventative health intervention. However, this thesis does have its strengths and limitations, discussed below.

The qualitative nature of the research is unique for preventative health information in Mississippi. It was difficult to find information that focused on health ministry in faith-based organizations much less studies on faith-based intervention that utilized Mississippi churches. Many studies that involve faith-based intervention have been conducted in states with strong public health programs, like North Carolina and Georgia. By bringing this idea to Mississippi, a region with a high prevalence of type-2 diabetes and a strong, religious African American community, this study might spark interest in many of the Mississippi health related agencies to direct more focus to health in the African American church.

This study also provides two descriptive yet understandable sections for people living with or who have a risk of developing type-2 diabetes: the biochemical processes that occur in type-2 diabetic individuals and a nutritional overview on how to prevent or

control the disease. For Mississippians, it is crucial to understand how nutritional choices can influence or deter the onset of type-2 diabetes, for they live in an area that is unfortunately suitable for higher risk of diabetes development. Furthermore, knowing what happens inside the body of a diabetic individual and how nutrition factors into these biochemical mechanisms can provide vital information for people outside of the science community who want to learn more about the disease and feel in control over their condition.

By engaging pastors in discussions about nutrition, the health of their church, and the role that health can play in the church, the interviews might have provoked many pastors to begin pursuing stronger initiatives for health improvement among their church congregation. Quantitative surveys are usually very rigid, impersonal, and do not allow pastors to really think about the issues assessed. Qualitative interviews, on the other hand, probed pastors to answer challenging questions about health within their church and among their community. By personally talking with pastors, the interviews might have encouraged introspection into this current focus of health ministry and might have inspired a desire to use health as another means to help the congregation and further their spiritual understanding of the Bible.

The study only included eight interviewed pastors, providing far too small of a sample size to accurately address the visibility of health-focused ministry among the many churches in Mississippi. Since most of the literature review detailed Mississippi Delta statistics and discussed how the Delta environment might play a large role in higher rates of type-2 diabetes, it would have been worthwhile to have a larger analysis of Delta churches and their efforts on congregational health. Also, it is possible that only the

pastors already interested in church health were willing to participate in the study, or that pure chance allowed for a greater percentage of more health-conscious interviews than what might actually be representative of Mississippi. I had hoped to interview more pastors but unforeseen problems with reaching pastors, especially in the Delta, impeded this intention. Of all of the Delta churches contacted, only one did not have a disconnected phone line. Of the other churches contacted, most were unable to have me speak to the pastor directly, even after multiple attempts.

Also, due to time constraints and academic responsibilities, I was unable to include a quantitative study that analyzed data on the current focus on health in African American churches of Mississippi. A more scientific and objective study may have provided for a better indication of the current status of health in the African American church as well as a means to better judge the church as a setting for preventative health intervention from a purely quantitative standpoint. By only giving qualitative data, the research leaves open the possibility that pastors embellished their church's emphasis on health or omitted information to place the church in a more nutritionally progressive position.

9.3 Suggestions for Future Research

The findings of this research as well as the extensive literature review provide multiple suggestions for further study in Mississippi. While the results include a very small sample size of Mississippi churches, the desire for many churches in Mississippi to provide a more health-conscious environment for their congregation is evident. What seems to serve as a hindrance for a healthier church environment is simply a lack of

knowledge or desire to start a program from scratch. Further studies should provide pastors or members of the health ministry information on nutrition, especially information geared toward helping those with type-2 diabetes or other chronic diseases, and develop ways to help jumpstart health ministries for interested churches.

As seen by the literature review of faith-based interventions in various states, it would serve Mississippi well to have a larger emphasis on faith-based organizations as settings for type-2 diabetes prevention research. These organizations are better suited in reaching out and influencing members of the community than more formal approaches. Future studies should use a RCT design and a broader inclusion of candidates or churches. Also, a bigger emphasis on Scripture and what the Bible says about physical health might serve as a more influential method of encouragement than just motivation from other peers. These studies must also ensure full church cooperation, especially from the pastor. Lastly, it is crucial to see the true, long-term effects that church-based intervention provides for its congregation. By comparing church-based results to those conducted in more secular environments, it is possible to determine if faith-based organizations are just as suited or better suited to improve the health of religious African American Mississippians.

Most importantly, health agencies and researchers need to begin honest dialogue about health with pastors across the state. Type-2 diabetes is a very serious problem in Mississippi and the prevalence and incidence rates must be reduced for the sake of the Mississippi citizens and for the preservation of our culture. By better informing pastors about health, Mississippi's public health agencies would be more adept to reach and inform a majority of the population.

APPENDIX

1. Pastor Interview Guide

My name is Troy Jackson, and I am a senior Pre-Medicine Biochemistry major at the University of Mississippi. Born and raised in central Mississippi, I have developed a deep, loving connection with the state and its people. In August 2012, I will begin medical school in hopes of becoming an active Mississippi doctor and giving back to this state that I love and cherish. It is with this adoration that I sit in front of you today. Having numerous friends and family with type-2 diabetes, and countless hours of experience in Mississippi's hospital wards, I have witnessed high levels of health problems facing many Mississippians, especially diabetes. After an eye-opening medical missionary trip to Nicaragua, I have decided to study the problem of type-2 diabetes in Mississippi, learn more about the variety of factors that might influence type-2 diabetes in the African American community, and help better understand ways we can work together to reduce this health problem among our state's residents.. This interview is the best way for me to gain information about health, culture, and lifestyle within the African American church community. If you have any questions before, during, or after the interview, please ask me or refer to the given consent form.

Introduction:

1. Name of Pastor/Food Director/Congregation Member/Years at the Church

2. Church Name and location

3. How many attend your church on a regular basis?

4. What percentage of your congregation regularly attends church functions other than worship service? A rough estimate of this percentage is fine.

Food Service within the Church:

My first set of questions will going to ask you about your church's food service history and details about its delivery.

1. Does your church serve meals to your congregation on a regular basis?

    1a. If yes, how often?

    1b. If yes, describe one of these events to me.

2. Does your church serve meals on special occasions (Thanksgiving, Christmas, First Sunday, etc.)?

    2a. If yes, how often?

    2b. If yes, describe one of these events to me (who, what, when)

3. How long has your church served meals to its congregation?

4. Has the frequency changed? For example, used to do serve meals only for special events for several years but in the last year or so, your church now offers them twice a week plus special events.

5. Who provides and prepares this food (food staff, catering, potluck, etc.)?

6. Where are these meals served?

7. If you had to make your best guess, what percentage of the congregation attends these food events on average?

8. Please list some of the foods that are regularly served?

    8a. For meats: how is the meat prepared?

9. Has anyone in your congregation requested a change in which foods are served due to health complications (allergy, high cholesterol, heart problems, diabetes, etc.)?

9a. If yes, what was the reason?

9b. How did you and/or the food staff respond?

Community Health/Church Response:

My next set of questions ask you about general church support and problems faced by members of your congregation.

1. Do you believe that people in your community look to the church for support, help, and guidance? Why or why not?

2. Do you see chronic disease as a problem in your community? Why or why not?

3. What has the church done in response to these problems?

4. Has your church implemented any sermons, church functions, or information sessions on health-related topics (preventative health, chronic disease information, etc.)

4a. If yes, please describe one of these events.

5. Have church members ever asked for the church to give a sermon or information session on health?

6. If a church member were to make such a request, describe your level of interest and willingness.

7. Do you know people in your congregation whom are diabetic or have a history of diabetes in the family?

7a. How common do you believe diabetes among members of your congregation?

8. Will you please explain the following Bible verse to me? It is from 1 Cor. 6:19-20

"Do you not know that your body is a temple of the Holy Spirit, who is in you, whom you have received from God? You are not your own; 20 you were bought at a price. Therefore honor God with your body."

8a. Do you think Paul could be referring to the importance of maintaining a healthy lifestyle throughout one's journey with Christ?

9. Can you think of any other parts of the Bible in which faith and physical health are linked?

9a. How receptive do you think members of your congregation would be to hearing sermons about physical health and preventive care?

9b. How receptive do you think members of your congregation would be to participating in church functions focused on physical health and preventative care?

10. If you were to host a sermon and information session about the connection of physical health to spirituality and then allow only healthy foods to be served at church-promoted functions, how do you think the congregation would react?

11. Do you think the church should have any opinion in how people treat their bodies? Why or why not?

12. Are there any other things that you'd like to share with me about this topic?

It was a pleasure to meet with you today. Thank you for your time answering my questions. I appreciate your assistance in this research project.

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